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DEPARTMENT OF THE INTERIOR
J. A. KRUG, SECRETARY

BUREAU OF MINES
R. R. SAYERS, DIRECTOR

INFORMATION CIRCULAR

SOME RESULTS OF INSPECTIONS OF EXPLOSIVES-STORAGE FACILITIES UNDER THE FEDERAL EXPLOSIVES ACT

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BY

P. R. MOYER

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SOME RESULTS OF INSPECTIONS OF EXPLOSIVES-STORAGE FACILITIES UNDER THE FEDERAL EXPLOSIVES ACT[1]

By P. R. Moyer[2]

INTRODUCTION

The Federal Explosives Act (55 Stat., 863), as amended, was passed by Congress on December 26, 1941, and became effective immediately; it amended the Act of October 6, 1917 (40 Stat., 385). The purpose of the Act was to regulate the manufacture, storage, use, and possession of explosives in order to prevent sabotage and to assure that explosives and ingredients would not fall into unauthorized hands. Under the provisions of the Act, the Director of the Bureau of Mines was authorized to administer its provisions under the supervisions of the Secretary of the Interior.

EXPLOSIVES-CONTROL DIVISION

To administer the Act, necessary personnel were employed in accordance with the appropriation made from a special presidential fund and later by Congress, and the Explosives Control Division was organized as a part of the Health and Safety Branch of the Bureau of Mines constituting the fourth division of that branch. A central office was established in Washington, D. C., and field offices were designated largely at the offices of the Health and Safety Branch throughout the country, and 50 explosives investigators were employed and assigned to work from these offices under the direction of the district engineers of the eight districts into which the United States is divided by the Health and Safety Branch. The territory assigned to each investigator was based on the approximate amount of explosives stored in that area; however, smaller territories were assigned to investigators stationed near the Pacific coast, which was indicated as critical by the armed forces.

The duties of the explosives investigators included investigation of explosions and fires and inspection of all places in which explosives or ingredients were manufactured, transported, stored, and used. In addition to the investigators, certain personnel of the Health and Safety Branch were authorized to assist in the enforcement of the Act so as to avoid duplication of inspection work by employees of the Health and Safety Branch.

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[1] The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is used: "Reprinted from U. S. Bureau of Mines Information Circular 7398."

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The full force consisted of 50 explosives investigators, approximately 130 coal-mine inspectors from the Coal-Mine Inspection Division, 70 engineers and instructors from the Safety Division, and approximately 50 engineers from the Mineral Production Security Division, a total of approximately 300. In order to prevent duplication in making inspections, the coal-mine inspectors reported on storage facilities inspected at large coal-mining operations in connection with their duties; Mineral Production Security Division engineers reported on magazines at large metal mines, nonmetal mines, and quarries; safety engineers reported on magazines at various operations in connection with their work; and explosives investigators reported on vendor, Government, logging, seismograph, small coal- and metal-mine, quarry, and miscellaneous storages in addition to numerous duties connected with the licensing provisions of the Federal Explosives Act. Inspections made at operations included on the War Department Responsibility list are not included in this report.

The Federal Explosives Act and the regulations issued thereunder required all persons handling explosives or ingredients to be licensed except those employees of a licensed employer to whom explosives or ingredients were issued for use on the operating premises. The requirement of a license was one method used to prevent unauthorized persons from obtaining or holding explosives or ingredients. To prevent the theft of explosives or ingredients, it was necessary that adequate storage facilities be provided by license holders who had explosives or ingredients in their possession. The work of the authorized representatives included checking licenses and inspecting magazines.

At the time of organization of the Explosives Control Division in 1942, no specific instructions or regulations pertaining to the storage of explosives and ingredients had been formulated. In the beginning, authorized personnel contacted licensees and acquainted them with the requirements of the Act and regulations in force. At the same time, explosives engineers of the Health and Safety Branch of the Bureau of Mines, with the assistance of a special committee from the Institute of Makers of Explosives, were preparing tentative standards for acceptable storage facilities. On July 15, 1942, a pamphlet containing general instructions for storing, handling, and transporting explosives was published and issued to licensees. The instructions were reasonably related to the effectuation of the purposes of the Act, particularly the prevention of sabotage and a determined attempt to see that explosives and ingredients would not fall into unauthorized hands. These instructions were supplementary to State and local requirements; if the latter requirements were stricter than the instructions, those requirements were controlling. The pamphlet was used as a guide by explosives investigators and authorized representatives when inspecting explosives-storage facilities. When making an inspection, each inspector filled out a magazine-report sheet containing essential information and forwarded it to the Washington office. The information obtained from the magazine reports, letter reports, and correspondence with licensees regarding storage instructions was used in preparation of sections 25 to 30, inclusive, of the regulations approved March 16, 1944. These regulations, issued under the Act, contained specific minimum requirements for the storage of high explosives, low explosives, detonators, blasting-device heaters, and general requirements for the storage of ingredients.

The basic requirements of the regulations were similar in many respects to the instructions, the chief differences being in the specific minimum requirements set out for storage of different types of explosives and the amount of explosives permitted to be stored in a box-type magazine. The new regulations were mandatory, and variations were allowed only in those cases in which appeals were made and granted in accordance with the provisions contained in section 30. (See page 7.)

Sections 25 to 30 of the Federal wartime explosives regulations were as follows:

"Section 25. Storage of high explosives.

(a) High explosives in amounts exceeding 125 pounds. All high explosives in amounts exceeding 125 pounds shall be stored in permanent magazines which are theft-resistant, fire-resistant, and bullet-resistant.

(1) Construction of permanent magazines. Permanent magazines shall be of a building type, an igloo or army type, a portable type, or a tunnel or dugout type, whether located on or exposed to the surface or underground. Walls of building-type magazines shall be substantially constructed of theft- and bullet-resistant materials. Walls shall meet the following standards or be constructed of other materials in a manner which will make them at least equally theft- and bullet-resistant:

(i) Solid construction, not less than 6 inches in thickness of materials such as concrete, masonry, medium-soft brick, or wood; or

(ii) Filled construction, such as concrete blocks with the cells filled with screened sand, weak concrete, cement mortar, or other effective bullet-resistant filler; or exterior and interior wooden walls not less than 6 inches apart, with the space between filled with screened sand, weak concrete, cement mortar, or other effective bullet-resistant filler, and the exterior walls covered with sheet iron not lighter than No. 26 gauge or other fire-resistant material; or

(iii) Lined construction, such as steel plate not lighter than No. 14 gauge, lined with weak concrete, cement mortar, brick, or screened sand not less than 6 inches in thickness, or with hardwood not less than 2 inches in thickness, or with softwood not less than 3 inches in thickness.

The same standards shall govern the construction of any artificial enclosing wall for tunnel- or dugout-type magazines on or exposed to the surface of the ground.- Any artificial enclosing wall for permanent underground magazines shall be substantially constructed of wood not less than 2 inches in thickness or of other material of equivalent or greater strength.

Foundations of building-type magazines shall be substantially constructed, and any space between the floor and the ground shall be enclosed in such a manner as to prevent the entrance of persons, animals, sparks, and firebrands.

Roofs of building-type magazines shall be fire-resistant and substantially constructed to resist theft, as, for example, by 3/4-inch sheathing covered with sheet iron or slate. Roofs not constructed of fireproof material shall be covered with sheet iron not lighter than No. 26 gauge or other fire-resistant material. The roofs of magazines so located that it is possible to fire bullets directly through the roof into the explosives shall be made bullet-resistant by material of construction or by a ceiling that forms a tray containing not less than a 4-inch thickness of sand or other equally effective bullet-resistant filler erected in the interior of the magazine, or by other methods.

Doors of magazines on or exposed to the surface of the ground shall be constructed of 3/8-inch steel plate lined with a 2-inch thickness of wood; or of a thinner steel plate with a greater thickness of wood at the rate of 1 additional inch of wood for each 1/8-inch decrease in the thickness of the steel plate; or of wooden walls at least 4 inches apart and filled with screened sand or other effective bullet-resistant filler, the exterior being covered with sheet iron not lighter than No. 26 gauge or other fire-resistant material; or of wood not less than 6 inches in thickness; or of reinforced concrete not less than 4 inches in thickness. Doors of magazines located underground shall be substantially constructed of wood not less than 2 inches in thickness or of other material of equivalent or greater strength.

Doors of all permanent magazines shall be equipped with two mortise locks; or with two padlocks fastened in separate hasps and staples; or with a combination of a mortise lock and a padlock; or with a mortise lock that requires two keys to open; or with a three-point lock. Padlocks and mortise locks shall be the equivalent of five-tumbler jarproof locks. Doors shall be provided with strong hinges, hasps, and staples attached by welds, rivets, or bolts fitted with lock washers and nuts on the inside of the magazine and installed in such a manner that the fastening cannot be removed when the magazine is locked.

Magazines shall have no openings except for entrance and ventilation. Foundation vents shall be of an offset-type construction, and all vents shall be effectively protected with metal screening or otherwise constructed to prevent the entrance of persons, animals, sparks, or firebrands or the direct penetration of bullets than can detonate the explosives.

(2) Marking of premises. The premises on which a permanent magazine is located shall be conspicuously marked by signs containing the words "Explosives - Keep Off." Such signs shall adequately warn any person approaching the magazine of the presence of explosives, but the signs shall not be so placed as to direct general public attention to the location of the magazine. No signs shall be placed on surface magazines or barricades or be so located that a bullet passing directly through the face of a sign will strike the magazine.

(b) High explosives in amounts not exceeding 125 pounds. High explosives in amounts of 125 pounds or less may be stored in permanent magazines complying with the standards set forth in section 25 (a), including subsections (1) and (2). If not so stored, such high explosives shall be stored in box-type magazines which are theft-resistant.

(1) Construction of box-type magazines. Box-type magazines shall be strongly constructed of 2-inch hardwood or 3-inch softwood or other equally theft-resistant material. Any metal magazine shall be lined with a nonsparking material. Doors or lids shall be provided with strong hinges, hasps, and staples attached by welds, rivets, or holts fitted with lock washers and nuts on the interior of the magazine and installed in such a manner that the fastening cannot be removed when the magazine is locked. Box-type magazines shall be equipped with at least one lock equivalent to a five-tumbler jarproof lock.

(2) Location of box-type magazines. Box-type magazines, when located outside a building, shall be securely anchored. No magazine shall be placed in a building containing oil, grease, gasoline, waste paper, or other highly inflammable materials, nor shall a magazine be placed less than 20 feet from a stove or furnace or open fire or flame or less than 5 feet from other sources of external heat.

(3) Marking of magazines. Box-type magazines shall be painted red or another distinctive color and clearly and conspicuously marked "Explosives."

Section 26. Storage of low explosives.

(a) Low explosives in amounts exceeding 125 pounds. All low explosives in amounts exceeding 125 pounds shall be stored in permanent magazines complying with all of the standards set forth in section 25 (a), including subsections (1) and (2), except that

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permanent magazines for the storage of low explosives need not be bullet-resistant. Any metal magazine shall be lined with a nonsparking material.

(b) Low explosives in amounts not exceeding 125 pounds. All low explosives in amounts of 125 pounds or less may be stored in permanent magazines complying with the standards set forth in section 25 (a) or section 25 (a). If not so stored, such low explosives shall be stored in box-type magazines complying with all of the standards set forth in section 25 (b), including subsections (1), (2), and (3).

Section 27. Storage of detonators.

(a) Detonators in numbers of 1,000,000 or more. All detonators in numbers of 1,000,000 or more shall be stored in permanent magazines complying with all of the standards set forth in section 25 (a), including subsections (1) and (2).

(b) Detonators in numbers of more than 5,000 and less than 1,000,000. All detonators in numbers of more than 5,000 but less than 1,000,000 shall be stored in permanent magazines complying with all of the standards set forth in section 25 (a), including subsections (1) and (2), except that permanent magazines for the storage of detonators need not be bullet-resistant. Any metal magazine shall be lined with a nonsparking material.

(c) Detonators in numbers of 5,000 or less. All detonators in numbers of 5,000 or less may be stored in permanent magazines as above indicated. If not so stored, such detonators shall be stored in box-type magazines complying with all of the standards set forth in section 25 (b), including subsections (1), (2), and (3).

(d) Storage with other explosives. No detonator shall be stored in any magazine containing high or low explosives or blasting-device heaters.

Section 28. Storage of fuse.

Fuse may be stored in permanent magazines or in box-type magazines together with high or low explosives or detonators. If not so stored, fuse shall be stored in locked containers or locked rooms or otherwise adequately protected against theft.

Section 29. Storage of explosives ingredients.

(a) Explosives ingredients generally. Except as provided in subsection (b), explosives ingredients shall be stored in permanent magazines, box-type magazines, locked containers, locked rooms, or locked buildings, or shall be otherwise adequately protected against theft.

(b) Blasting-device heaters.

(1) Blasting-device heaters in total weights exceeding 125 pounds. All blasting-device heaters containing ingredients of explosives, when the total weight of such heaters exceeds 125 pounds, shall be stored in permanent magazines complying with all of the standards set forth in section 25 (a), including subsections (1) and (2), except that permanent magazines for the storage of blasting-device heaters need not be bullet-resistant. Any metal magazine shall be lined with a nonsparking material.

(2) Blasting-device heaters in total weights not exceeding 125 pounds. All blasting-device heaters containing ingredients of explosives, when the total weight of such heaters is 125 pounds or less, may be stored in permanent magazines, as above indicated. When not so stored, such blasting-device heaters shall be stored in box-type magazines complying with all of the standards set forth in section 25 (b), including subsections (1), (2), and (3).

(3) Storage with explosives. No blasting-device heaters shall be stored in any magazine containing high or low explosives or detonators.

Section 30. Modification of storage and handling requirements.

(a) Grounds for modification. In unusual circumstances, when compliance with any requirement of sections 24-29 is physically impractical, prohibitively expensive, or for any reason not feasible, the requirement may be suspended or modified by the procedure set forth in subsection (b):

(1) When the method of storing or handling explosives or explosives ingredients affords a measure of safety and protection to explosives or explosives ingredients equivalent to that provided by the standards described in these regulations; or

(2) When the method of storing or handling explosives or explosives ingredients, in the particular circumstances, affords the greatest feasible measure of safety and protection to such explosives or explosives ingredients; or

(3) When, in the judgment of the Director, other good and sufficient reasons justify relaxation of any requirement and the safety or security of persons or of buildings, railroads, highways, underground workings, or other property is not thereby unduly threatened or impaired.

(b) Procedure for modification. Any licensee may request suspension or modification of any requirement of sections 24-29. Such request should be made in writing and should clearly indicate, in the light of the provisions of subsection (a) of this section, the nature of the request and the reasons therefor. The request should be addressed to the Explosives Control Division, Bureau of Mines, Washington 25, D. C. The licensee will be notified in writing if the request is granted in whole or in part. If any licensee, after having possession of a copy of sections 24-29 or notice of their provisions, fails to request suspension or modification of any requirement of such regulations, or fails to make such a request within 5 days after being informed by a representative of the Bureau of Mines of his noncompliance with any requirement of sections 24-29, he shall be subject to all of the penalties for the violation of these regulations."

PROCEDURE FOLLOWED IN ENFORCING STORAGE REQUIREMENTS

Routine inspections of storage facilities were initiated in July 1942. Verbal instructions were given to the licensee at the time of the inspection, and attention was called to the requirements of the instructions for storing, handling, and transporting explosives that were in effect. Upon adoption of the storage regulations in March 1944, the specific requirements were indicated by reference to those sections that were applicable. The investigator noted pertinent information, including verbal instruction, on the magazine inspection report, which was transmitted to the Washington office.

The reports were reviewed and classified for further action. Immediate attention was given to those reports that indicated unsatisfactory facilities, and a letter was transmitted to those licensees calling attention to the inadequate storage and requesting that the Explosives Control Division be informed of the action taken to provide satisfactory facilities. Reports indicating minor infractions were handled in a similar manner at a later date. Reports showing satisfactory magazines, full compliance, and no need for further action were filed.

The replies from the licensees were reviewed, and those indicating satisfactory compliance were filed. When the reply was considered inadequate, a subsequent letter requesting further information on action taken was transmitted. Copies of letters transmitted to licensees were sent to the appropriate investigator for his information.

Reinspection reports were treated as original reports; immediate attention was given to those cases where the facilities were inadequate and no attempt had been made to provide suitable magazines. In most of these cases, a registered letter was transmitted to the licensee stating the violations noted at the reinspection and requiring that a reply be made within 15 days, indicating what action had been taken or would be taken to comply. The contents of a favorable reply were sent to the investigator with instructions to reinspect when again in that vicinity. If the reply was not satisfactory, another letter was transmitted to the licensee requesting further information. If the second reply was still unsatisfactory, or if no reply to the original letter was received within the specified time limit, the investigator was instructed to reinspect as soon as possible and report his findings. If this report showed satisfactory evidence of compliance or near compliance, a warning letter was transmitted to the licensee requesting continued and complete compliance within a reasonable period of time. When the requested report indicated no action or indifference to the requirements, the case was given to the solicitors for further action. Reinspection reports showing minor infractions were handled as original reports, and those showing full compliance were filed.

Cases that indicated continued noncompliance with the requirements were handled by the Mines Division of the Office of the Solicitor, Department of the Interior. A Specification of Charges, which contained data about all previously reported violations and continued failure to comply, was transmitted to the licensee. The licensee was required to file a reply to the charges within 15 days, either admitting the charges and indicating action taken to comply or including evidence of intention to comply, or denying the charges. The licensee was also offered a chance for an oral hearing for the purpose of presenting further evidence in the proceedings, said hearing to be held before a representative of the Director, either in Washington, D. C., or in the district office of the Bureau of Mines in the district where the violations occurred. Failure to file an answer or request a hearing within the specified time limit automatically resulted in the revocation of licenses issued to the licensee. A majority of the replies to the Specification of Charges showed compliance or a willingness to comply. In the latter case, the licensee was given sufficient time to comply, and a specified date was set on which reinspection was to be made by an investigator and all violations were to be corrected. In some instances, hearings were requested and held, and the decisions of the Hearing Officers were submitted to the Director for further action. Several licenses were revoked because the licensee failed to refute the evidence of the investigator and was decided to be violating the requirements of the Act. At some of the hearings, the licensee gave proof of compliance and the proceedings were dismissed; some cases were held pending as the licensee was unable to correct all of the violations owing to circumstances beyond his control. Reinspection was made at a later date to determine compliance.

RESULTS OF MAGAZINE INSPECTIONS

General

From January 1, 1942, to December 31, 1944, a total of 1,441,016,901 pounds of industrial explosives was manufactured and sold in the United States.[3] This included all high explosives and black blasting powder used in mining, quarrying, construction, and other operations during this period.

During the period when the Act and regulations were being enforced, inspections were made of approximately 25,800 facilities used for storing (1) high explosives, including dynamite, permissibles, and nitroglycerin, and (2) low explosives, including black blasting powder (granular and pellet) and gun powder. In addition, more than 2,000 additional licensees were interviewed, who stated that explosives were purchased as required, who handled only fireworks, or who stored ingredients of explosives such as fertilizers, laboratory supplies, and drugs.

More than 47,500 magazine reports were submitted on original inspections and reinspections. Approximately 32,000 letters were transmitted to licensees calling attention to any violations of the Act or regulations pertaining to storage as reported by investigators.

Owing to the small inspection force and the large area to be covered, it is evident that not all of the explosives storages in the country were inspected. In fact, original or first inspections were being made in August 1945, the last month of active enforcement. Also, it was not possible to inspect as many known facilities as desired, and in many instances only a first inspection report was made, and probably there are many places where explosives were stored and no inspection was made.

Inspections were made of facilities in all parts of the country and covered operations using or handling explosives, such as coal mining, metallic and nonmetallic mining, quarrying, logging, construction, excavation, stripping, manufacturing, ditching, oil prospecting, land clearing, vending, etc. Principal users and storers of explosives are classified in table 1. The storages are classified by coal mines, metal and nonmetal mines, quarries, seismograph or oil prospecting, logging, vendors, government (which includes Federal, State, and local agencies), and a miscellaneous group comprising other industries not specifically classified. A further breakdown indicates the two types of facilities required - either permanent magazines or box-type magazines. When the amount of explosives stored was in excess of 125 pounds, the facility was classed as requiring a permanent or building-type magazine, and when the amount stored was less than 125 pounds, it was indicated as requiring a box-type magazine; however, where the amount stored was less than 125 pounds and a permanent magazine was in use, the facility was classed as a permanent storage.

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[3] Adams, W. W., and Wrenn, V. E., Production of Industrial Explosives in the United States: Bureau of Mines Tech. Papers 658 and 665, 1943-1944; Mineral Market Report No. MMS 1283, 1945.

TABLE 1

Industry and Classification	Storages reported	Facilities, first inspection	Compliance, first inspection	Percent compliance, first inspection	Compliance, reinspection	Compliance by letter	Purchase as needed, inspection and letter	Cease handling, inspection	Cease handling, letter	Total compliance	Percent compliance	New magazines
Coal:												
Permanent	4,667	3,534	491	10.5	1,694	864	33	78	64	3,224	69.1	1,027
Box	2,323	320	114	4.9	275	483	132	92	135	1,231	53.0	666
Total coal mining	6,990	3,854	605	8.7	1,969	1,347	165	170	199	4,455	63.7	1,693
Metal:												
Permanent	2,526	2,141	816	32.2	654	454	4	82	82	2,092	82.8	349
Box	909	297	165	18.2	125	182	16	93	81	662	72.8	223
Total metal mining	3,435	2,438	981	28.6	779	636	20	175	163	2,754	80.2	572
Quarry:												
Permanent	1,997	1,717	259	13.0	812	416	9	46	38	1,580	79.1	288
Box	381	155	68	17.8	85	80	25	19	26	303	79.5	100
Total quarrying	2,378	1,872	327	13.8	897	496	34	65	64	1,883	79.2	388
Seismograph:												
Permanent	387	379	204	52.7	112	71	-	-	-	387	100.0	46
Logging:												
Permanent	410	206	47	11.5	158	56	10	39	15	325	79.3	150
Box	98	23	16	16.3	21	8	3	18	11	77	78.6	26
Total logging	508	229	63	12.4	179	64	13	57	26	402	79.1	176
Vendors:												
Permanent	3,494	2,938	1030	29.5	1,002	477	33	267	229	3,038	86.9	324
Box	2,687	798	300	11.2	639	382	104	335	387	2,147	79.9	691
Total vendors	6,181	3,736	1330	21.5	1,641	859	137	602	616	5,185	83.9	1,015

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TABLE 1 (Cont'd.)

Industry and Classification	Storages reported	Facilities, first inspection	Compliance, first inspection	Percent compliance, first inspection	Compliance, reinspection	Compliance by letter	Purchase as needed, inspection and letter	Cease handling, inspection	Cease handling, letter	Total compliance	Percent compliance	New magazines
Government:												
Permanent	1,345	1,220	245	18.2	457	276	9	56	71	1,114	82.8	141
Box	554	262	109	19.7	107	104	44	42	46	452	81.6	125
Total government	1,899	1,482	354	18.6	564	380	53	98	117	1,566	82.5	266
Miscellaneous:												
Permanent	1,985	1,620	398	20.1	494	499	11	107	131	1,640	82.6	228
Box	2,027	755	445	22.0	243	387	207	189	224	1,695	83.6	499
Total miscellaneous	4,012	2,375	843	21.0	737	886	218	296	355	3,335	83.1	727
Total:												
Permanent	16,811	13,755	3,490	20.8	5,383	3,113	109	675	630	13,400	79.7	2,553
Box	8,979	2,610	1,217	13.5	1,495	1,626	531	788	910	6,567	73.2	2,330
Grand total	25,790	16,365	4,707	18.3	6,878	4,739	640	1,463	1,540	19,967	77.4	4,883

A review of the original or first inspection reports showed a lack of acceptable magazines, particularly where the amount stored did not exceed 125 pounds of explosives. In many instances, the facilities provided were so inadequate that immediate action was necessary. Either the licensee was instructed to provide a full-time guard until an adequate magazine could be provided, or the local authorities were requested to take action. Explosives in varying quantities were found "stored" in the open, on or under rock ledges, loose rocks or logs, in sheds, barns, lean-tos, corn cribs, and other outbuildings that had not provisions for locking, on and under counters in stores, behind the bar in saloons, in basements of houses, and even under beds and kitchen stoves. Reports were received on 16,811 storages which were classed as permanent facilities. Of this total, 3,056, or 18 percent, did not have facilities that could be called magazines. The remaining 13,755, or 82 percent, had buildings that were considered to be magazines; however, only 3,490, or 25 percent of these magazines, met the minimum requirements, and the other 75 percent required some alterations, mainly improvement of locks, doors, fastenings, and linings. Inspections were made of 8,979 storages that did not exceed 125 pounds and were classed as requiring box-type magazines. Of this number, 6,389, or 71 percent of the total, did not have any facilities; the other 2,610, or 29 percent of the total, had box-type magazines. Only 1,217, or 46 percent of the box-type magazines, met the minimum requirements; the remaining 54 percent required some improvements, chiefly better locks, proper fastening of hinges, hasps, and staples, and anchoring to prevent unauthorized removal. Actually, of the 25,790 explosives storage facilities reported, only 4,707, or 18.3 percent, could be considered as adequate according to the standards set out in the instructions and regulations.

From the reinspection reports and from letters received from licensees, it is indicated that 4,883 new magazines were constructed during this period; 2,553 were permanent magazines and 2,330 were box-type magazines. Many of the new magazines were replacements of former facilities, and it is not certain that all of those reported by letter meet the minimum requirements of the regulations laid down under the administration of the Federal Explosives Act.

To determine the extent of improvement in storage facilities during the active enforcement period, a survey was made of the files, and all storages that could be considered as complying with the requirements were tabulated. The facilities in compliance are listed under the column headings "Compliance - First Inspection," "Compliance - Reinspection," "Compliance by Letter," "Purchase as Needed - Inspection and Letter," "Cease Handling - Inspection," and "Cease Handling - Letter." Inspection and reinspection reports of the inspectors that show compliance were listed under the applicable heading, as were satisfactory replies from licensees. The totals of all results under these headings were taken as compliance with the regulations. Noncompliance was derived from the unanswered letters in the files.

The results show that of the 25,790 storages inspected and reported, 19,967, or 77.4 percent, complied with the requirements of the regulations or ceased handling and storing explosives.

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CLASSIFICATION BY INDUSTRY

Coal Mines

During the period January 1, 1942, to December 31, 1944, a total of 585,225,041 pounds of explosives was used in mining coal. This total includes black blasting powder, high explosives other than permissible, and permissible explosives. During the period in which the Federal Explosives Act was actively enforced, 6,990 facilities used for storage of explosives at coal mine operations were inspected. The reports show that at 4,667 facilities, the amount stored exceeded 125 pounds and that the remainder was used for storage of less than this amount. The analysis shows that on first inspection 10.5 percent of the permanent facilities and 4.9 percent of the box-type facilities complied with the standards.

The majority of the large established coal-mining operations storing more than 125 pounds of explosives had some provisions for storage and distribution. Reinspection reports and replies from operators indicate good compliance with the requirements, either by construction of new magazines or by remodeling and improving existing magazines. However, in 1,133 places the amount stored was greater than 125 pounds, and the facilities provided could not be classed as magazines. Many of the places reported to have no facilities for storage were small stripping operations where the work was being done by contractors and very little attention was given to the security of explosives. Some compliance was obtained at these operations by construction of magazines, by obtaining storage space at established magazines in the vicinity, or by purchasing explosives as required. The productive life of small operations was of short duration; in many cases, reinspections and replies from operators indicated completion of contract and no further need for storing or handling explosives.

Inspections were made of 2,323 storages at coal operations where the amount of explosives stored did not exceed 125 pounds. The majority of these reports indicated that generally the amount stored did not exceed one case of high or permissible explosives weighing 50 pounds, one 25-pound keg of black blasting powder, or one case of pellet powder weighint 25 pounds. Usually, explosives were purchased in these amounts and the purchase was made only when the available supply was exhausted. The facilities provided were inadequate, as only 320 storages were classed as suitable for box-type magazines, and of this total only 114 were accepted as meeting the requirements at the time of the original inspection. Most of the small coal mines were operated by individuals or partnerships and in many instances were worked to supply fuel for home consumption and possible small sales to neighbors. The reports show that many varieties of storage places were used, and few precautions were taken to prevent theft or illegal use of the explosives. Favorite open places for storing included mine openings, various places in the mines, sheds and dugouts near mine openings, barns, chicken coops, outbuildings, and various places in and around dwelling houses.

The tabulated results indicate that this group of licensees was lax in meeting the requirements and show the smallest percentage of compliance of any of the industries. Usually, the operations were isolated and were worked only during the winter months, and because of adverse conditions it was not possible to make a large number of reinspections. Many of the reinspections did show some improvement, but most compliance was noted from replies to letters, which indicated a tendency to cease handling or to purchase as needed.

The coal-mining industry is commended on the construction of 1,027 permanent magazines, as reported by reinspections and by letters. There is still much room for improvement, as approximately 30 percent of the permanent facilities in use do not meet the requirements for reasonably safe storage of explosives at coal mines. The small-coal-mine operators showed some interest in providing secure storage for explosives, as is indicated by the reported construction of 666 new box-type magazines, but official records show that greater improvement is needed, as only 53 percent of the storages inspected could be classified as complying with reasonable regulations for safe storage of explosives, by no means a commendable situation.

Metal Mines

This classification includes explosives storage facilities at underground and open-pit metal mines and at some of the nonmetallic underground operations. Approximately 345,000,000 pounds of explosives were used in metal mining in the United States during the period January 1, 1942, to December 31,1944. Inspections were made of 3,435 storages, of which 2,526 were classed as containing more than 125 pounds and the remainder as less than this amount. The reports show that 32.2 percent of the large facilities were classed as satisfactory on first inspection and that 18.2 percent of the small storages were acceptable.

In general, the metal-mining industry had acceptable facilities for storing large amounts of explosives; reports show that 2,141 were classed as permanent magazines and without undue effort or expenditure could be improved to meet the standards. A large number of the accepted magazines were underground, and some of the larger operations are commended for the well-constructed magazines that were located in safe, isolated sections. Nearly all of the large open-pit mines had excellent storage facilities. Final analysis shows that 82.8 percent of the permanent explosives storages of metal mines inspected had been improved to meet the Federal requirements. Many of the mines that ceased operation during this period had been producinc gold and silver ore and were restricted by wartime regulations. It was reported that 349 new permanent magazines were constructed.

Of the 909 small storages inspected, 297 were classed as box-type magazines on first inspection, but only 165 were considered as complying with the standards. Many of the small operations were situated in isolated or inaccessible locations and were usually without any explosives storage facilities. The small supply of explosives was generally kept in the mine opening or under a rock ledge near the workings. Because of the unusual conditions, few of the storage places were reinspected. Many of the licensees were engaged in prospecting or in producing gold ore and were required to cease operations because of wartime restrictions. Total compliance was fair, as 72.8 percent of the storages inspected were listed as complying with the requirements of the regulations. Records show that 223 box-type magazines were constructed.

Quarries

This classification includes storage facilities at stone quarries, slate quarries, sand and gravel pits, and some nonmetallic operations. Approximately 242 million pounds of explosives were used in quarrying during the period January 1, 1942, to December 31, 1944. Inspections were made of 2,378 explosives storage places, of which 1,997 were classed as storing more than 125 pounds of explosives, and the remaining 381 as storing less than this amount. The reports show that 13.0 percent of the large storages and 17.8 percent of the small storages were in compliance with the Federal wartime standards on first inspection.

Although the reports on large storages at quarry operations show only a small percentage of compliance on first inspection, many of the operations had facilities that would be acceptable for magazines after improvements were completed. In general, the large facilities were constructed substantially and lacked only additional locks required by the regulations. At a few quarries, the facilities were inadequate; however, in many cases new permanent magazines were provided, as the records show the construction of 288 new facilities. The quarry industry as a whole is commended on the care taken in providing adequate permanent magazines for the storage of explosives.

Inspections were made of 381 storage places where the amount stored did not exceed 125 pounds. Some of the smaller quarries and pits had inadequate storage facilities, and at many of them operations were discontinued during the war. Some of the small storages were reported at large quarries, where explosives for primary blasting were purchased as needed and small amounts for secondary blasting were stored. In some cases box-type magazines were used for storage of the daily supply for secondary blasting at the quarry faces. Not as much attention was given to the storage of small amounts of explosives, as only 155 box-type magazines were in use, and of this number only 68 were reported as satisfactory on first inspection; however, compliance was good, as the records indicate that 79.5 percent of the storages were reported to meet the requirements and 100 new box-type magazines were constructed.

Seismograph Exploration

Explosives storages of seismograph-exploration or oil-prospecting companies were reported in 10 States, but results were segregated only for Texas, Oklahoma, Mississippi, and Louisiana, where most of these operations were being conducted; the remainder were included in the miscellaneous classification for the other States. In every case the amount of explosives being stored exceeded 125 pounds.

Trailer-type magazines were used in most cases, as such construction can be moved as work progresses. These magazines were well-constructed of heavy sheet iron and were usually located in isolated sections, with the wheels removed. Explosives were not transported in the trailers but were delivered after the magazine had been located. In the spring of 1942, the Society of Exploration Geophysicists held a meeting, which was attended by representatives of the various companies engaged in this work, and the storage of explosives was a principal topic of discussion. A representative of the Bureau of Mines stated the prospective requirements for explosives magazines and discussed methods whereby the facilities in use could be improved. The cooperation of the companies was excellent, and improvements beyond the instructions and regulations were adopted, mainly the addition of protective shields or hoods for all locks and locking devices. New magazines were constructed substantially and were equipped with excellent locking devices; in addition, the Bureau of Mines was asked to approve new magazines before they were placed in service.

Of the 387 storages tabulated separately, 204, or 52.7 percent, were considered to comply with the standards on the first regular inspection; less than 2.0 percent of the total was considered inadequate. Compliance was excellent, as reinspections and replies to letters indicated 100 percent cooperation on these storages. Cooperation and compliance also were noted in reports received on inspections in States other than those tabulated. Forty-six new magazines were reported as having been constructed for geophysical parties in Texas, Oklahoma, Mississippi, and Louisiana.

Logging Operations

Logging operations are conducted in many of the States; however, separate tabulations were made only of the inspections reported from Oregon, Washington, Idaho, and Mississippi, where logging is an important industry; operations in other States are listed under the "miscellaneous" classification. Special attention was paid to the storage of explosives in the Pacific Coast States, particularly to large storages in isolated places such as the logging camps and operations in Oregon and Washington.

In the four States tabulated, 508 storages were inspected, of which 410 were classed as storing more than 125 pounds of explosives and the remaining 98 as storing less than this amount. In general, the facilities provided were inadequate, as only 11.5 percent of the permanent storages and 16.3 percent of the box-type storages complied with the Federal wartime standards on first inspection.

First inspection reports listed large amounts of explosives stored in the open with no protection from theft. Many of the facilities in use were poorly constructed of rough lumber and were weakened from rough handling in moving from place to place. Most of the explosives were used in construction of roads, for breaking material to be used for ballast, for removing stumps, and for clearing land. Approximately 50 percent of the large facilities inspected and tabulated separately were classed as magazines of such nature that they could be improved to meet the standards. Good complianc•

was obtained in Oregon, Washington, and Idaho, owing to special measures taken by various Federal authorities, including the armed forces, and with the cooperation of the State enforcement authorities. Most of the companies and individuals engaged in logging in Mississippi were engaged in removing stumps; adequate facilities were provided at most of the operations.

Compliance of the logging industry with the requirements was good. It is noted that 79.3 percent of the large storages and 78.6 percent of the small storages, in the four States tabulated complied with the requirements or ceased handling explosives. According to reports, 150 new permanent and 26 new box-type magazines were constructed. Compliance of logging operations in other States was in about the same proportion.

Vendors

All explosives manufactured and used in the United States, except for direct shipments from the manufacturing plant to the operating company, pass through the hands of vendors and at one time or another are stored for varying lengths of time before reaching the purchaser. The vendor may be the manufacturer operating through distributing magazines, the agent of the manufacturer, a local distributor, the local supply house, hardware or grocery store, or independent merchant, or even a saloon. It is possible that some explosives may be handled and stored by several firms or individuals before reaching the ultimate consumer. Inspection reports show that in virtually all cases the manufacturers and the manufacturers' agents had excellent storage magazines, as their main purpose is to provide suitable explosives to the user. These magazines were well-constructed, fairly theft-resistant, well maintained, and generally visited at relatively frequent intervals for receiving shipments and making deliveries. The facilities provided by the vendors who received the explosives from the manufacturer or agent were seldom suitable, though some of the large independent distributors had acceptable magazines; the other vendors, especially those dealing in small quantities, were usually lax in providing adequate explosives-storage facilities.

Inspections were made of 6,181 storages maintained by vendors. Of this number 3,494 were classified as storing in excess of 125 pounds of explosives and the remaining 2,687 as storing less than this amount. Most of the large storages were classed as having magazines, but only 1,030, or 29.5 percent of the total, were reported as meeting the requirements on first inspection. The smaller vendor explosives storages were not satisfactory, as only 300, or 11.2 percent of the total, were considered to comply with reasonable explosives storage facilities on original inspection.

Most of the 1,030 permanent vendor explosives magazines that passed the requirements on first inspection were owned by manufacturers of explosives and were used as distributing magazines by the companies or their agents. The manufacturers are commended for the care taken of explosives while in their possession. All vendors and users of explosives would do well to follow the rules and regulations for storing and handling explosives as established by the manufacturers and the Institute of Makers of Explosives, especially in regard to the construction and maintenance of magazines. Many of the other facilities, classed as magazines by the inspectors, were well-constructed but required improvements, such as new doors, approved locks, and bullet-resistant lining in order to meet minimum Federal standards. Approximately 16 percent of the large facilities inspected were considered inadequate, and many of these vendors discontinued handling explosives for the duration of the war. The tabulated results covering storage in excess of 125 pounds of explosives show very good compliance, as 86.9 percent of the vendors met the requirements of the regulations. Reinspections and replies to letters show that 324 new permanent magazines were constructed.

Inspections were made of 2,687 vendor storages where the amount of explosives being stored did not exceed 125 pounds and were classed as requiring box-type magazines. Only 798 of these inspection reports showed facilities that could be classed as magazines, and a mere 300 were accepted as meeting the Federal requirements of first inspection. These reports indicate that approximately 70 percent of the vendors storing small amounts of explosives had not provided any kind of storage facility that could be called a magazine. The inspectors reported explosives stored in sheds, barns, garages, warehouses, and outbuildings with no provisions for preventing theft, except possibly a cheap padlock. In many stores, the explosives were kept on or under the counters, in display cases, in lockers or drawers, or openly in the basement, generally with no protection against theft except the lock on the store door. Some vendors also operated saloons and kept the explosives behind the bar or in a side room. Quite a number of the dealers maintained fairly good magazines for storing large amounts of explosives to be sold in case lots but failed to provide magazines for the explosives kept in the stores for small sales, that is, by the pound or cartridge. Many vendors who stored about 100 pounds for sale in small lots as an accommodation to customers discontinued handling explosives when informed of the Federal wartime requirements. The results show that 79.9 percent of the licensees complied with these requirements and that 691 new box-type magazines were constructed; however, approximately 33 percent of the total compliance is represented by discontinuance of sales and storage.

Government

With few exceptions, Federal, State, County, and local government agencies and authorities storing and handling explosives provided magazines. Federal agencies used explosives for forest work, highway construction, prospecting for strategic minerals and ores, coal mining, opening ditches, clearing slides, and for various other purposes. State, County, and local authorities used explosives mainly in highway construction and maintenance. Inspections were made of 1,899 storages, of which 1,345 were classed as requiring permanent magazines and the remainder as requiring box-type magazines. Reports of inspections showed that 1,220 large storage facilities inspected could be classed as explosives storage magazines that were acceptable upon being somewhat remodeled; only 245, or 18.2 percent, of the total permanent storages met the requirements on first inspection. Of the 554 small storages inspected, 262 were classed as suitable for box-type magazines, and 109 of these, or 19.2 percent of the total, were considered satisfactory on first inspection.

A majority of the large explosives storages inspected were operated by Federal agencies, and most of the magazines were well-constructed and were acceptable after the addition of approved locks. Some of the magazines had deteriorated from age and were abandoned or replaced with new structures. Some of the magazines operated by State and County authorities had to be abandoned or replaced. Cooperation in general was good, as the results show that 82.8 percent of the large governmental explosives storages inspected were approved and 141 new permanent magazines were constructed.

Not as much attention was given to the storage of small amounts of explosives, especially by highway departments and local authorities. In many instances, small amounts of explosives were found in garages, sheds, and offices having little or no protection against theft. A large proportion of the small storages were discontinued, and in some cases explosives were purchased only as needed. Results show, either by letter or by reinspection, that 81.6 percent of the small storages complied with the requirements, and that 125 new box-type magazines were constructed.

Miscellaneous Users

This category includes all industries and other users and handlers of explosives not specifically tabulated, such as construction, railway work, ceramic industries, fertilizer manufacturing, oil-well shooting, ditching, pipeline laying, land clearing, well drilling, etc. In addition, inspections of seismograph and logging storages in States other than those already mentioned are included in this category. Inspections were made of 4,012 of these miscellaneous storages of explosives, of which 1,985 stored more than 125 pounds of explosives and 2,027 stored less than this amount. Reports show that 1,620 of the large facilities inspected could be classed as suitable permanent magazines after improvements had been made; however, only 398 magazines, or 20.1 percent of the total large facilities inspected, met requirements on first inspection. Inspections of 2,027 small storages revealed that in 755 cases the facilities were considered to be suitable box-type magazines, but only 445, or 22.0 percent of the total, met requirements on first inspection.

More than 81 percent of the industries and users of explosives in this classification that stored more than 125 pounds had provided a building or magazine which could be improved to meet requirements. The manufacturers of nitroglycerin and other companies engaged in using this type of explosives in shooting oil wells are commended on the storage facilities provided and the cooperation extended in complying with the Federal wartime requirements. Commendations also are due the companies engaged in extracting material for ceramic products, who cooperated by remodeling existing magazines or constructed new magazines.

The majority of licensees in this group that had inadequate facilities were engaged in construction work. Most of the contractors engaged in building construction, road building, excavation, and similar work requiring the use of explosives were lax in providing storage magazines for the large amounts of explosives stored at the operation. Usually, the contracts were completed in a relatively short time, and reinspections and replies to letters indicated that explosives were no longer required. Special attention was given to these licensees, and subsequent operations of the same companies usually resulted in compliance.

The final results show good compliance, as 82.6 percent of the total of large storages inspected met the requirements of the regulations. A total of 228 new permanent magazines were constructed.

As was the case in specific industries, the inspectors reported lack of adequate storage facilities for small amounts of explosives among miscellaneous users. Little or no attention was paid to protecting the explosives from theft, and varying amounts were found in readily accessible places. Some of the individuals interviewed had obtained licenses to purchase small amounts of explosives for use in digging a well or trench, removing a stump, blasting a boulder, opening a ditch, or similar projects upon completion of which there was no further need for any remaining explosives. Many of these licensees had only a small supply of explosives on hand at the time of the inspection, and these were disposed of either by using them, returning them to the vendor, or by destroying them. Of this group, 413 signified their intention to discontinue handling and storing explosives, and 207 stated that explosives would be purchased only as needed. Ultimate compliance in this group was good, 83.6 percent of the storages met the requirements of the regulations. Reinspections and replies to letters indicated the construction of 499 new box-type magazines.

RESULTS CLASSIFIED BY STATES

General

Peacetime regulation of explosives by the States has been directed primarily toward safety and the prevention of crime. In time of war it is essential to prevent acquisition of explosives by persons who may use them for sabotage. Some of the State laws require that explosives be kept in substantially constructed magazines or in containers that are to be kept locked when an attendant is not present; but generally laws and regulations are inadequate and in many cases little or no enforcement is in effect. The Department of the Interior and its Bureau of Mines recognized the necessity for controlling explosives through the medium of the States and proposed a model explosives act to be presented to the State legislatures in 1941. This act was primarily a licensing statute and was adopted by several States. The experience of the Bureau of Mines in administering the Federal Explosives Act revealed deficiencies in the content and scope of the model act, and in 1942 additional amendments were promulgated to tighten the licensing procedure and to strengthen the act further by the inclusion of additional provisions for inspection and seizure of illegally held explosives and to provide for the issuance of regulations on all phases of the handling of explosives. Later, the need for further tightening of the model act was indicated, and in 1944 a new model was proposed to several State legislatures. The new act contained all of the previous recommendations as well as minimum specifications for construction of adequate magazines and a provision regarding their locations. The regulatory provision included authorization to strengthen the minimum specifications of construction and to provide for inspection of magazines by enforcement officials. The new model act was modified to meet existing laws in some of the States in which it was proposed to the Legislatures.

The enactment of the model explosives act was suggested to aid in the control of explosives during the emergency as well as provide a workable law for State control in the post-war period and to increase the cooperation between State enforcement officials and the Bureau of Mines inspectors in carrying out the pusposes of the Federal Explosives Act. An effective State program administered by one enforcement agency is necessary for adequate control of explosives.

A summary of State laws on explosives was compiled in 1943.[4] It does not include any legislation passed after 1942 or any proclamations, regulations, or administrative orders. The statutory provisions pertaining to the storage of explosives of each State were grouped under sectional headings with explanation of contents as follows:

"Storage in General. This section is limited to the storage of explosives whether for manufacture or sale or otherwise, but excludes storage in mines and other special industries.

"Storage and Use in Mines. As regulations for the use and storage of explosives in mines usually differ greatly from regulations for surface operations, this difference has been carried into the outline. Included in this section are many safety regulations indirectly concerned with explosives through the regulation of related tools and machinery.

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[4] Summary of State Laws Pertaining to Explosives. Part 1. District B. Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont: Bureau of Mines Inf. Circ. 7251, 1943, 118 pp.
Summary of State Laws Pertaining to Explosives. Part 2. Districts A and C. Kentucky, Maryland, Ohio, Pennsylvania, Virginia, West Virginia: Bureau of Mines Inf. Circ. 7252, 1943, 73 pp.
Summary of State Laws Pertaining to Explosives. Part 3. Districts E and F. Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, Wisconsin: Bureau of Mines Inf. Circ. 7253, 1943, 91 pp.
Summary of State Laws Pertaining to Explosives. Part 4. Districts D and G. Alabama, Arkansas, Florida, Georgia, Kansas, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas: Bureau of Mines Inf. Circ. 7254, 1943, 75 pp.
Summary of State Laws Pertaining to Explosives. Part 5. District H. Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming: Bureau of Mines Inf. Circ. 7255, 1943, 106 pp.

"Storage and Use in Special Industries. In various States certain industries are the subject of regulations for the storage and use of explosives. This section contains the specific requirements set up by these statutes."

An analysis of the summary shows that 22 of the 48 States have included some general provisions pertaining to the storage of explosives in the State Explosives Act or in other statutes. In most cases the specifications are indefinite, and the laws of only 5 States contain specific requirements for the construction, location, and maintenance of explosives magazines. The model explosives act adopted by several States requires that a license be obtained for possession of explosives and usually authorizes a State official to make and enforce rules and regulations necessary to administer the provisions of the act. In States having no explosives act, the authority to regulate the storage of explosives is usually contained in some manner or to some extent in some other statute. The summary shows that the statutes of 25 of the 48 States contain such authority. The laws of 30 of the States empower the authorities of cities, towns, and villages to prohibit or regulate and enforce rules, regulations, or ordinances covering the storage of explosives within their jurisdiction. Four States have no provisions pertaining to explosives in their statutes.

The authority to make and enforce rules, regulations, and standards pertaining to explosives varies in the States having this provision in the statutes. Administering officials and agencies include Fire Marshals, Police Commissioners, Industrial Accident Commissions, Insurance Commissioners, Labor Departments, and others. In some States, the authority to regulate the storage of explosives is divided between several departments or enforcement agencies, each directly concerned with some specific industry such as coal mining, metal mining, or other industrial activity; therefore, it is quite possible that the requirements may vary for different industries in these States.

Some State authorities have issued good specifications covering the storage of explosives, whereas in other States the requirements are indefinite and inadequate, and in some instances no regulations have been promulgated, even though the power to do so is contained in the statutes. The enforcement of the provisions of the laws and the rules and regulations is good in some States, but in many cases the authorities charged with administering such requirements are handicapped by lack of funds, personnel, or policy. After the declaration of war, many of the States, especially those in strategic areas, tightened the requirements and adopted a strict policy of enforcement. In some instances, the Federal requirements were used instead of existing State requirements or were adopted as a supplement to such requirements.

A brief summary of matters pertaining to the storage of explosives is included in the analysis of results of storage inspections reported by the Bureau of Mines personnel in the administration of the Federal Explosives Act during 1942, 1943, and 1944.

TABLE 2

Class of storage	Storages reported	Magazines, first inspection	Compliance, first inspection	Percent compliance, first inspection	Total compliance	Percent total compliance	New magazines
Alabama:							
Permanent	299	260	56	18.7	228	76.3	62
Box	52	13	5	9.6	26	50.0	8
Total	351	273	61	17.4	254	72.4	70
Arizona:							
Permanent	410	335	123	30.0	367	89.5	65
Box	325	78	53	16.3	261	80.3	75
Total	735	413	176	23.9	628	85.4	140
Arkansas:							
Permanent	269	180	42	15.6	177	65.8	51
Box	135	34	7	5.2	93	68.9	43
Total	404	214	49	12.1	270	66.8	94
California:							
Permanent	877	778	260	29.6	812	92.6	79
Box	470	182	105	22.3	401	85.3	103
Total	1,347	960	365	27.1	1,213	90.1	182
Colorado:							
Permanent	436	365	67	15.4	350	80.3	97
Box	373	165	115	30.8	296	79.4	137
Total	809	530	182	22.5	646	79.9	234
Connecticut:							
Permanent	62	61	23	37.1	53	85.5	4
Box	43	36	22	51.2	36	83.7	2
Total	105	97	45	42.9	89	84.8	6
Delaware:							
Permanent	7	7	1	14.3	7	100.0	1
Box	17	9	8	47.1	15	88.2	5
Total	24	16	9	37.5	22	91.7	6
Florida:							
Permanent	85	63	20	23.5	69	81.2	22
Box	26	9	9	34.6	22	84.6	6
Total	111	72	29	26.1	91	82.0	28
Georgia:							
Permanent	138	101	13	9.4	94	68.1	19
Box	80	21	10	12.5	56	70.0	21
Total	218	122	23	10.6	150	68.8	40

TABLE 2 (Cont'd.)

Class of storage	Storages reported	Magazines, first inspection	Compliance, first inspection	Percent compliance, first inspection	Total compliance	Percent total compliance	New magazines
Idaho:							
Permanent	326	271	76	23.3	286	87.7	59
Box	134	38	17	12.7	111	82.8	36
Total	460	309	93	20.2	397	86.3	95
Illinois:							
Permanent	541	511	99	18.3	471	87.1	105
Box	217	125	23	10.6	121	55.8	40
Total	758	636	122	16.1	592	78.1	145
Indiana:							
Permanent	348	285	44	12.6	255	73.3	90
Box	113	32	13	11.5	88	77.9	43
Total	461	317	57	12.4	343	74.4	133
Iowa:							
Permanent	340	262	19	5.6	206	60.6	51
Box	218	36	11	5.1	113	51.8	58
Total	558	298	30	5.4	319	57.2	109
Kansas:							
Permanent	467	348	111	23.8	380	81.4	94
Box	296	84	54	18.2	219	74.0	107
Total	763	432	165	21.6	599	78.5	201
Kentucky:							
Permanent	964	643	132	13.7	621	64.4	205
Box	451	70	34	7.5	212	47.0	107
Total	1,415	713	166	11.7	833	58.9	312
Louisiana:							
Permanent	182	157	77	42.3	169	92.8	15
Box	39	18	9	23.1	37	94.9	13
Total	221	175	86	38.9	206	93.2	28
Maine:							
Permanent	137	95	22	16.1	118	86.1	19
Box	125	38	19	15.2	103	82.4	38
Total	262	133	41	15.6	221	84.3	57
Maryland:							
Permanent	166	118	26	15.7	124	74.7	34
Box	92	24	9	9.8	60	65.2	33
Total	258	142	35	13.6	184	71.3	67

TABLE 2 (Cont'd.)

Class of storage	Storages reported	Magazines, first inspection	Compliance, first inspection	Percent compliance, first inspection	Total compliance	Percent total compliance	New magazines
Massachusetts:							
Permanent	87	84	31	35.6	78	89.7	3
Box	50	28	13	26.0	42	84.0	12
Total	137	112	44	32.1	120	87.6	15
Michigan:							
Permanent	260	257	86	33.1	248	95.4	20
Box	72	53	37	51.4	65	90.3	6
Total	332	310	123	37.0	313	94.3	26
Minnesota:							
Permanent	362	298	134	37.0	335	92.5	44
Box	211	53	23	10.9	190	90.0	79
Total	573	351	157	27.4	525	91.6	123
Mississippi:							
Permanent	120	105	42	35.0	106	88.3	14
Box	30	7	4	13.3	17	56.7	9
Total	150	112	46	30.7	123	82.0	23
Missouri:							
Permanent	357	262	54	15.1	292	81.8	96
Box	229	49	13	5.7	174	76.0	99
Total	586	311	67	11.4	466	79.5	195
Montana:							
Permanent	398	287	121	30.4	320	80.4	87
Box	141	25	17	12.1	62	44.0	40
Total	539	312	138	25.6	382	70.9	127
Nebraska:							
Permanent	26	19	2	7.7	19	73.1	4
Box	46	3	1	2.2	27	58.7	18
Total	72	22	3	4.2	46	63.9	22
Nevada:							
Permanent	223	193	52	23.3	203	91.0	40
Box	72	23	5	6.9	48	66.7	15
Total	295	216	57	19.3	251	85.1	55
New Hampshire:							
Permanent	68	52	9	13.2	55	80.9	10
Box	73	14	7	9.6	65	90.4	23
Total	141	66	16	11.3	121	85.8	33

TABLE 2 (Cont'd.)

Class of storage	Storages reported	Magazines, first inspection	Compliance, first inspection	Percent compliance, first inspection	Total compliance	Percent total compliance	New magazines
New Jersey:							
Permanent	82	79	25	30.5	70	85.4	7
Box	85	57	42	49.4	76	89.4	12
Total	167	136	67	40.1	146	87.4	19
New Mexico:							
Permanent	238	192	31	13.0	188	79.0	31
Box	272	24	9	3.3	221	81.3	82
Total	510	216	40	7.8	409	80.2	113
New York:							
Permanent	527	519	87	16.5	403	76.5	14
Box	389	301	132	33.9	314	80.7	43
Total	916	820	219	23.9	717	78.3	57
North Carolina:							
Permanent	237	198	28	11.8	175	73.8	33
Box	148	17	8	5.4	112	75.7	26
Total	385	215	36	9.4	287	74.5	59
North Dakota:							
Permanent	133	80	4	3.0	91	68.4	48
Box	200	33	12	6.0	145	72.5	74
Total	333	113	16	4.8	236	70.9	122
Ohio:							
Permanent	515	439	74	14.4	358	69.5	53
Box	520	188	60	11.5	357	68.7	101
Total	1,035	627	134	12.9	715	69.1	154
Oklahoma:							
Permanent	456	386	169	37.1	402	88.1	78
Box	138	76	33	23.9	114	82.6	29
Total	594	462	202	34.0	516	86.9	107
Oregon:							
Permanent	564	361	71	12.6	495	87.8	170
Box	304	56	32	10.5	262	86.2	77
Total	868	417	103	11.9	757	87.2	247
Pennsylvania:							
Permanent	2,163	1,859	487	22.5	1,676	77.5	166
Box	882	93	38	4.3	542	61.4	235
Total	3,045	1,952	525	17.2	2,218	72.8	401
Rhode Island:							
Permanent	12	10	3	25.0	10	83.3	1
Box	13	8	3	23.1	13	100.0	2
Total	25	18	6	24.0	23	92.0	3

TABLE 2 (Cont'd.)

Class of storage	Storages reported	Magazines, first inspection	Compliance, first inspection	Percent compliance, first inspection	Total compliance	Percent total compliance	New magazines
South Carolina:							
Permanent	64	54	10	15.6	47	73.4	5
Box	74	19	6	8.1	64	86.5	15
Total	138	73	16	11.6	111	80.4	20
South Dakota:							
Permanent	110	81	5	4.5	83	75.5	28
Box	159	29	10	6.3	117	73.6	48
Total	269	110	15	5.6	200	74.3	76
Tennessee:							
Permanent	316	237	62	19.6	206	65.2	49
Box	133	12	5	3.8	69	51.9	38
Total	449	249	67	14.9	275	61.2	87
Texas:							
Permanent	544	461	190	34.9	498	91.6	65
Box	249	71	32	12.9	209	83.9	97
Total	793	532	222	28.0	707	89.2	162
Utah:							
Permanent	317	304	121	38.2	267	84.2	34
Box	135	59	39	28.9	90	66.6	28
Total	452	363	160	35.4	357	79.0	62
Vermont:							
Permanent	67	63	18	28.8	64	95.5	11
Box	72	32	13	18.1	63	87.5	25
Total	139	95	31	22.3	127	91.4	36
Virginia:							
Permanent	204	146	15	7.4	145	71.1	55
Box	55	22	7	12.7	34	61.8	14
Total	259	168	22	8.5	179	69.1	69
Washington:							
Permanent	484	411	101	20.9	412	85.1	64
Box	150	18	7	4.7	110	73.3	16
Total	634	429	108	17.0	522	82.3	80
West Virginia:							
Permanent	1,281	1,021	151	11.8	920	71.8	263
Box	512	80	36	7.0	334	65.2	139
Total	1,793	1,101	187	10.4	1,254	69.9	402
Wisconsin:							
Permanent	337	287	46	13.6	251	74.5	33
Box	293	137	47	16.0	222	75.8	40
Total	630	424	93	14.8	473	75.1	73
Wyoming:							
Permanent	206	170	50	24.3	195	94.7	54
Box	96	11	3	3.1	80	83.3	23
Total	302	181	53	17.5	275	91.1	77

Alabama

Nearly 52 million pounds of explosives were used in Alabama during the years 1942 to 1944, inclusive. Approximately 47 percent of the explosives were used in producing coal, 35 percent in producing iron ore, 11 percent in quarrying, and the remainder in construction and for other purposes. Inspections were made of 351 storages, 299 of which were reported as storing more than 125 pounds and 52 as storing less than that amount. Many of the facilities were well-constructed, as reports show that 273 could be improved to meet Federal wartime requirements; however, only 61, or 17.4 percent of the total storages, were approved on first inspection. The majority of the approved facilities were permanent surface magazines used by vendors and large underground magazines in iron-ore mines.

Reinspections and replies to letters show that 70 new magazines were constructed. However, general compliance was only fair, as final tabulations show that 72.4 percent of the facilities were improved to meet the standards or were discontinued. Most of the licensees not complying were coal-mine operators and vendors of explosives.

The laws of Alabama contain no specific requirements for explosives magazines, but the superintendent of insurance is empowered to make regulations for the storage of explosives and may prescribe the materials used in construction of buildings used for storage. It is unlawful for any person to keep more than 50 pounds of explosives on hand at any one time within the limits of any incorporated city or town. It is the duty of municipal corporations to provide a suitable fireproof building beyond their corporate limits, for the storage of explosives, and they may control or prohibit the construction of magazines within the police jurisdiction.

Arizona

During the period 1942 to 1944, inclusive, over 58 million pounds of explosives were used in Arizona. Virtually all of the explosives were used in mining copper and other ores. Reports were submitted on 735 storages, 410 being classed as requiring permanent magazines and 325 as requiring box-type magazines. Generally, the large explosives-storage facilities were found suitable, but many of the small facilities were considered inadequate. The inspectors indicated that 413 facilities would be approved after certain improvements were completed. A total of 176 magazines, mostly permanent magazines in and near metal mines, were approved on first inspection. More than two-thirds of the small facilities offered no protection against theft, and many of the small facilities were discontinued after the first inspection.

Compliance with the requirements of the regulations was very good, as final results show that 85.4 percent of the total explosives storages were improved to meet the Federal wartime standards or were discontinued. The majority of the licensees who failed to answer letters were engaged in metal mining or prospecting. Some improvement is indicated by the construction of 65 permanent magazines and 75 box-type magazines during the inspection period.

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The laws of Arizona include very few provisions regarding the storage of explosives. It is unlawful to keep more than 25 pounds of high explosives or more than 50 pounds of blasting powder or gunpowder in any building within half a mile of the limits of any town. The Mines and Mining Code requires that explosives in excess of a 24-hour supply must be stored in magazines, but there are no definite requirements for construction of magazines.

Arkansas

Statistics show that 15,750,692 pounds of explosives were used in Arkansas from January 1, 1942, to December 31, 1944. More than 41 percent of the total was used in metal mining, 32 percent in construction, 18 percent in coal mining, and the remainder in other industries. Reports were received on 404 explosives storages, of which 269 were indicated as storing more than 125 pounds and 135 as storing less than this amount. Only 214 facilities could be classed as magazines, and 49 storages, or 12.1 percent of the total, were approved on first inspection. Most of the approved facilities were permanent magazines owned and operated by the manufacturers of explosives. Magazine inspection reports showed that facilities in use at 73 coal mines and by 53 vendors were inadequate and unsatisfactory for the storage of explosives.

Compliance was not good, as the results showed that only 66.8 percent of the storages met the requirements. Special action was required in some cases and resulted in the construction of new magazines or revocation of licenses. According to the unanswered letters, the chief violators continued to be coal-mine operators and vendors of explosives. Construction of 51 new permanent magazines and 43 box-type magazines was reported. There is still a definite need for improvement in explosives-storage facilities in this State.

The Arkansas laws contain no provisions on explosives, except that municipalities shall have the power to regulate the keeping of explosives and to provide or license magazines therefor.

California

Nearly 46 million pounds of explosives were used in California from 1942 to 1944, inclusive. More than 50 percent of the explosives were used in construction work and the remainder chiefly in metal mining and quarrying. Inspections were made of 1,347 explosives storages; 877 were classed as requiring permanent magazines and 470 were classed as requiring box-type magazines. First inspection reports showed that 960 of the facilities were accepted as suitable for storage after some improvements had been made; 365, or 27.1 percent of the storages, met the requirements. The permanent magazines were generally good, but many of the facilities provided for small amounts of explosives were unsatisfactory.

California was one of the States in a critical zone, as determined in the early years of the war by the War Department. Special attention was directed toward secure storage of explosives, and as a result excellent compliance was obtained. Results show 90.1 percent of the explosives storages complying with the Federal wartime requirements and the construction of 182 new magazines. Many of the existing magazines were improved, but a large number of licensees discontinued the use and handling of explosives, mainly metal-mining operations where the chief product was gold. Good cooperation was obtained from the State authorities and from various Federal agencies, especially the armed forces.

The Health and Safety Code of the State laws has some indefinite provisions regarding the storage of explosives; the main enforcement agency is The Industrial Accident Commission, which is empowered by law to issue safety orders, rules, and regulations covering the storage of explosives. The requirements of the commission did not include construction details of explosives magazines, and during the war they were amended by the adoption of the Federal wartime requirements on storage. The Accident Prevention Bureau of the Industrial Accident Commission did an excellent job of enforcing these requirements.

Colorado

Statistics show that more than 27-1/2 million pounds of explosives were used in Colorado during 1942 to 1944, inclusive. Approximately 62 percent of them were used in metal mining, 17 percent in construction, 11 percent in coal mining, and the remainder in other industries. Inspections were made of 809 explosives storages, 436 of which were used for storing more than 125 pounds and 373 used for storing smaller amounts. Reports indicate that 530 facilities could be classed as magazines, and 182 of these were considered as meeting the requirements on first inspection. The total of acceptable magazines includes 62 new box-type magazines constructed by a railroad company after the requirements were made known, and the plans were approved before construction. As the magazines were in isolated areas along the track right-of-way, inspections were made after the magazines were in use and therefore are included in the total of approved magazines.

The results indicate that 79.9 percent of the storages complied with the requirements, and that 97 new permanent and 137 new box-type magazines were constructed. Most of the compliance consisted in improving existing magazines; however, a number of licensees ceased handling explosives. A majority of the unanswered letters were addressed to coal- and metal-mining operations.

The Colorado laws contain very few provisions pertaining to the storage of explosives. The Mines and Minerals Law requires that explosives be stored in a fireproof building at coal mines and in magazines at other mines, but neither of these requirements is definite. The authorities of towns and cities are empowered to regulate or prevent the storage of explosives within the corporate limits or a mile outside the boundaries.

Connecticut

Not quite two million pounds of explosives were used in this State during 1942 to 1944, inclusive. Construction projects and quarrying accounted for virtually all of the explosives used. Inspections were made of 105 storages, 62 of which were classed as requiring permanent magazines and 43 as requiring box-type magazines. The reports indicated that 97 of the facilities in use were approved or would be approved upon completion of improvements; 45 magazines, or 42.9 percent of the total storages reported, were approved on first inspection.

Compliance with the Federal wartime explosives regulations was very good, as reinspection reports and replies to letters showed that 84.8 percent of the storages met the requirements and that six new magazines were constructed. Good cooperation was obtained from the State authorities and the licensees.

The Connecticut Explosives Act does not contain any specific requirements for storage magazines but the commissioner of State Police is authorized to prepare and enforce reasonable regulations for the safe and convenient storage of explosives. The rules and regulations, revised as of March 1941, are comprehensive and the enforcement policy of the State police is excellent.

Delaware

Delaware used the smallest amount of explosives, 134,434 pounds, of any of the States during 1942 to 1944, inclusive. Nearly all of them were used in construction and quarrying. Inspections were made of 24 storages, 7 of which were rated as permanent and 17 as box-type. Sixteen of the facilities were considered as magazines, but only nine complied with the requirements on first inspection. All of the permanent magazines were improved, and one new magazine was constructed as a replacement. Results show that 15 licensees storing small amounts complied with the requirements, making an average compliance of 91.7 percent for the State.

The State has a model explosives act that requires licenses for possession of explosives but contains no provisions concerning construction of explosives magazines. The attorney general may prescribe rules and regulations necessary for carrying out the provisions of the Act, which expires on May 15, 1947.

Florida

More than 13-1/2 million pounds of explosives were used in Florida during 1942 to 1944, inclusive. Quarrying and construction work accounted for nearly all of this amount. Most of the storages exceeded 125 pounds, as 85 were placed in this class, with 26 classed as small storages. The reports show that 72 of the facilities would be satisfactory for wartime explosives storage after improvements; 29, or 26.1 percent of the total,

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were approved on first inspection. Most of the approved permanent magazines were owned and operated by manufacturers of explosives.

Tabulated results show good compliance, as 82.0 percent of the storages met the requirements of Federal wartime explosives storage and 34 new magazines were constructed. Most of the compliance was accomplished by improving existing magazines to meet the standards set up under the administration of the Federal Explosives Act.

The Florida Explosives Act requires that a license be obtained in order to possess explosives. The only storage provision requires that unguarded explosives must be stored in a building and locked; the building must be posted with warning signs. The Department of Public Safety is the licensing authority and may prescribe rules and regulations deemed necessary to enforce the provisions of the Act. On August 25, 1942, the State fire marshall amended the existing State regulations to conform with the Federal regulations and requirements.

Georgia

According to statistics, 6,358,503 pounds of explosives were used in Georgia from January 1, 1942, to December 31, 1944. Nearly 60 percent of the explosives were used in quarrying and nonmetallic mining and the remainder in construction and other industries requiring explosives. Inspections were made of 218 storages, 138 of which were classed as requiring permanent magazines and 80 as requiring box-type magazines. Reports of inspectors showed a lack of adequate facilities, especially among licensees storing small amounts of explosives. Only 122 of the facilities could be classed as magazines, and 23, or 10.6 percent of the total, were approved on first inspections. Most of the approved magazines were the property of manufacturers of explosives.

Compliance with the regulations was only fair, as 68.8 percent of the storages were improved to meet the minimum standards or were discontinued. The unanswered letters in the files were addressed mainly to nonmetallic mining operations (mica), quarries, vendors, and local government agencies. During the inspection period, 40 new magazines were constructed. The general noncompliance indicates a need for better storage facilities in essentially all industries using or handling explosives in the State of Georgia.

The laws of Georgia require that a license be obtained to possess explosives but contain no requirements covering the storage of explosives. Towns, cities, and counties, however, have the authority to make and enforce needful rules and regulations regarding the keeping of explosives.

Idaho

More than 12-1/2 million pounds of explosives were used in Idaho during 1942 to 1944, inclusive. Approximately three-fourths of the total was used in metal mining and the remainder in construction, logging, quarrying,

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and for other purposes. Inspections were made of 460 storages; at 326 places the amount stored was more than 125 pounds, and at 134 places a smaller amount was stored. Reports showed that the facilities in 309 cases was suitable by being improved to meet the standards, and that 93, or 20.2 percent of the total storages inspected, met the standards on first inspection. Most of the approved magazines were located in or around metal mines.

Generally, the compliance with the explosives storage requirements of the wartime explosives act throughout the State was good, as 86.3 percent of the total met the requirements or were discontinued. Ninety-five new magazines, consisting of 59 permanent and 36 box-type, were constructed.

Idaho has no statewide explosives laws, but cities of the first class have the power to regulate or prohibit storage of explosives within the city. The Mines and Mining Law requires that explosives be stored in a properly designated building or in an underground excavation.

Illinois

The State of Illinois used 95,195,978 pounds of explosives during 1942 to 1944, inclusive, so that it ranks third in use of explosives during that period. More than 78 percent of the total amount was used in mining coal, 18 percent in quarrying, 3 percent in construction, and the remainder in miscellaneous industries. Inspections were made of 758 storages 541 of which were in excess of 125 pounds and 217 that were less than this amount. First inspection reports indicate that 636 of the facilities provided would be satisfactory for storage and accepted after certain improvements had been made; 122 of the facilities were approved on first inspection. Nearly all of the permanent magazines were well-constructed, but the facilities for storage of small amounts were wholly inadequate, as only 23, or 10.6 percent of those inspected, were approved on first inspection.

Final tabulations show that most of the permanent magazines were improved or replaced with new magazines, as results show 87.1 percent compliance and the construction of 105 new magazines. Compliance of licensees storing small amounts was not very good as only 55.8 percent met the requirements and only 40 new box-type magazines were constructed. Most of the noncompliance was noted among small coal operations and vendors. The average compliance for the State was 78.1 percent.

The laws of Illinois pertaining to the storage of explosives are included in the Mines and Miners Statute, which contains specific requirements for magazine construction, location, and operation, and in the Cities and Villages Code, which empowers corporate authorities to regulate the storage of explosives within the town limits. The State Department of Mines and Minerals administers the provisions of the law. Qualified inspectors appointed by the director make inspections and have the power to enforce compliance. The requirements of the Mines and Miners Statute compare favorably with the minimum standards contained in the regulations issued under the Federal Explosives Act.

Indiana

More than 44-1/2 million pounds of explosives were used in Indiana during 1942 to 1944, inclusive; 80 percent of the total was used in coal mining, approximately 15 percent in quarrying, and the remainder for other purposes. Inspections were made of 461 storages, and the reports showed that the amount stored in 348 places exceeded 125 pounds and at 113 places was less than this amount. Inspectors reported that with reasonable effort 317 of the facilities provided could be improved to meet the requirements, but all other facilities were considered inadequate. Only 57 magazines, or 12.4 percent of the total inspected, were approved on first inspection. Most of the inadequate storage facilities requiring permanent magazines were found at quarry operations, and the majority of inadequate facilities for small storages of explosives belonged to vendors and small coal operators.

Even though 90 new permanent magazines and 43 box-type magazines were constructed, compliance in general was not good, as final results show that only 74.4 percent of the total met the wartime Federal explosives storage requirements. Coal operations, quarries, and vendors were the chief violators; however, a decided improvement was noted at quarries where 39 permanent magazines were erected, and with vendors who constructed 24 new box-type magazines. Analysis shows that 44 coal-mine operators with acceptable permanent magazines did not reply to letters requesting action taken toward making minor improvements.

The State of Indiana has no explosives act, and provisions pertaining to storage of explosives are included in the Mines and Municipal Corporations Statutes. The Mines Law specifies that explosives shall be stored in a fireproof building or in a suitable "powder" house. The Municipal Corporations Law provides that the common council of every city has the power to enact ordinances to regulate or prevent the storage of explosives and that it is unlawful to store more than 100 pounds of high explosives within the limits of any municipal corporation or within 40 rods of any occupied dwelling or public building without obtaining the written consent of all adjacent landowners.

Iowa

Statistics show that 15,371,470 pounds of industrial explosives were used in Iowa during the period starting January 1, 1942, and ending December 31, 1944. More than 42 percent of the explosives were used in mining coal, 36 percent in quarrying, and the remainder in other industries. Inspections were made of 558 explosives storages, 340 of which were reported to be storing more than 125 pounds and 218 as storing less than 125 pounds. First inspection reports show that only 298 of the facilities provided could be improved to meet the requirements and that only 30, or 5.4 percent of the storages inspected, met the wartime standards on first inspection. Most of the permanent magazines approved on first inspection were owned and operated by manufacturers of explosives or their agents. Most of the permanent facilities were poorly constructed of 1-inch lumber, and most of the licensees holding small amounts of explosives, especially the vendors, had no facilities on first inspection; upon learning the wartime requirements, many of the vendors discontinued the sale and storage of explosives. There was a more or less general deficiency of secure storage facilities throughout the State.

Reports and letters show that 109 new magazines were constructed, and that 319, or 57.2 percent of the storages, met the requirements. Licensees storing more than 125 pounds of explosives who failed to reply to letters include 40 local government agencies, 39 vendors, 25 quarries, 21 coal operations, and 9 miscellaneous users. Licensees storing less than 125 pounds of explosives who failed to reply to letters include 74 vendors, 19 coal operations, 5 quarries, 4 local government agencies, and 3 miscellaneous users. Compliance results also include reports and statements of 52 licensees who discontinued storing and handling explosives. Although some improvement was accomplished during this period, there remains much room for further improvement in storing explosives for use or sale in Iowa.

The laws of Iowa contain only one definite provision regarding the storage of explosives, namely, the explosives stored in a coal mine must be kept in a securely locked box. Municipal authorities are empowered to license, inspect, and regulate the storage of explosives.

Kansas

More than 25 million pounds of explosives were used in Kansas during 1942 to 1944, inclusive. Approximately 33 percent was used in coal mining, 33 percent in metal mining, and the remainder in quarrying, construction, and miscellaneous industries. Inspections were made of 763 storages; 467 reports indicated storage of more than 125 pounds, and 296 reports showed storage of less than 125 pounds. According to the reports, 432 of the facilities were considered as magazines and 165 of this group were approved on first inspection. Most of the approved magazines belonged to metal mines and to manufacturers of explosives or their agents. The facilities provided for the storage of small amounts of explosives were inadequate as only 18.2 percent of the licensees had approved magazines on first inspection; vendors and small coal operators storing less than 125 pounds of explosives were the more numerous offenders.

Compliance with the wartime requirements was good for permanent magazines, as final results show that 81.4 percent met the requirements and 94 new magazines were constructed. Compliance by licensees storing small amounts was fair, as results show 74 percent complying and the construction of 107 new box-type magazines. Average compliance for the State was 78.5 percent. Improvement was noted at the small coal operations, where 22 new magazines were constructed, and with the vendors, who constructed 61 new box-type magazines; in addition, 27 of the vendors ceased handling explosives for the duration of the war.

Inspections were made also of 134 facilities used by County and City governments for the storage of sodium chlorate. Many of the facilities were satisfactory, and although the requirements in the regulations were not specific, many improvements, recommended by the investigators, were completed.

The Kansas laws contain no definite provisions for the storage of explosives. The Fire Protection Law authorizes the State fire marshal to make regulations for storage of explosives and may prescribe the material and construction of magazines. On October 17, 1942, regulations identical to the requirements of the Federal Bureau of Mines were issued by the State fire marshal.

Kentucky

Statistics show that 63,635,170 pounds of commercial explosives were used in Kentucky from January 1, 1942, to December 31, 1944, so that the State ranks as the fourth largest user of explosives during this period. Coal mining required more than 75 percent of the total, and most of the remaining 25 percent was used in quarrying and construction work. Inspections were made of 1,415 storages, of which 964 were classified as requiring permanent magazines and 451 as requiring box-type magazines. Generally, the facilities provided for the storage of explosives were not suitable, as only 713 of the total were considered as magazines that could be improved to conform to Federal wartime requirements, and of these only 166, or 11.7 percent of the total, were approved on first inspection. Reports show that 200 coal mines, 78 vendors, and 21 quarries storing more than 125 pounds of explosives did not have permanent magazines that could be remodeled. First inspection reports showed poor conditions prevalent in storages of less than 125 pounds, especially at 279 small coal operations where no facilities were provided and at the premises of 74 vendors where no protection was provided.

Excellent improvement was indicated by the construction of 205 permanent magazines and 107 box-type magazines, but general compliance was not good, as only 833, or 58.9 percent of the total explosives storages, met the Federal wartime requirements; the compliance total includes 90 licensees who indicated that they were discontinuing storage and handling of explosives. Unanswered letters show that among those requiring permanent magazines, 244 coal operators, 61 vendors, and 23 quarry operators failed to comply. No answers were received from 192 coal operators and 32 vendors reported to be storing less than 125 pounds of explosives. Although the reports on new magazine construction show a decided improvement in storage conditions, there is a particular need for further improvement in existing explosives-storage magazines and in the construction of additional facilities, especially at coal-mining operations in the State of Kentucky.

The only specific reference to the storage of explosives in the laws of Kentucky is contained in the Mining Statute and requires that magazines constructed after July 12, 1934, must be of noncombustible material. Another law gives the director of the Division of Insurance authority to issue standards of safety for industrial work and includes the storage of explosives. The standards, approved on September 25, 1941, contain effective specifications for the construction of explosives magazines and indicate that a permit must be obtained from the State fire marshal before explosives are stored. In addition, other State laws provide that city councils may regulate the storage of explosive material within the city limits.

Louisiana

During the years 1942 to 1944, inclusive, slightly more than 8-1/2 million pounds of explosives were used in Louisiana. Approximately 65 percent of them were used on construction work, 15 percent in quarrying and nonmetallic mineral mining, and 20 percent in other operations, which included seismograph exploration. Reports were submitted on 221 storages; 182 were reported as containing more than 125 pounds and 39 less than 125 pounds. First inspection reports indicated that 175 of the facilities provided were acceptable as magazines, and 86, or 38.9 percent of the total storages, were in compliance with wartime requirements.

Final reports show excellent cooperation, as 93.2 percent of the storages met the requirements and 28 new magazines were constructed. Of the total storages inspected, 108, or about 49 percent, were used in seismograph exploration work and the various companies engaged in this work complied fully with the standards.

On July 2, 1942, the Governor approved of an Explosives Act to remain in effect during the war and for a period of 6 months thereafter. This law required a license for the possession of explosives but contained no specifications on construction of magazines excepting that the secretary of State may prescribe such rules or regulations necessary to carry out the provisions of the Act.

Maine

During the period 1942 to 1944, inclusive, slightly more than two million pounds of explosives were used in the State of Maine. Normally, the annual consumption of explosives is small, as the chief industries using explosives - quarrying and nonmetallic mineral mining - are not extensive. During this period, large amounts were used in war construction, chiefly for the armed forces. Inspections were made of 262 storages, 137 being classed as requiring permanent magazines and 125 as requiring box-type magazines. Facilities provided were only fair, as reports show that only 133 were suitable for storage of explosives, and of this total, 41, or 15.6 percent of the total storages inspected, were approved on first inspection. Inadequate facilities were prevalent among vendors and miscellaneous users storing small amounts.

Compliance was good, as reports show the construction of 19 permanent and 38 box-type magazines and that 84.3 percent of the licensees complied with the requirements or discontinued storage.

The statutes of the State of Maine contain no requirements pertaining to the storage of explosives, except that the Insurance Commissioner may make regulations covering same. The regulations, issued in 1940, require that a permit be obtained to store explosives. Specifications covering construction of magazines are contained in the regulations and on the permits.

Maryland

Nearly five million pounds of explosives were used in Maryland during 1942 to 1944, inclusive. Coal mining, quarrying, and construction work were the principal industries using explosives. Reports show that facilities provided for large amounts were generally fair, but not much attention was given to facilities for small storages, especially by coal-mine operators and by vendors. Inspections were made of 258 storages, of which 166 were reported to be storing in excess of 125 pounds and 92 as keeping less than this amount. A total of 142 of the facilities provided was considered to be satisfactory for wartime explosives storage after suitable improvements had been made; 35, or 13.6 percent of the total inspected, were approved on first inspection.

Generally, compliance was only fair, as final results show that 71.3 percent of the total storages complied with the standards. Sixty-seven new magazines were constructed. No replies were received from letters sent to 39 coal-mine operators, 15 quarry operators, 4 vendors, 5 local government agencies, and 11 miscellaneous users. Although considerable improvement was evident through the construction of new magazines, there is a definite need for further improvement in storage facilities at coal operations and quarries in this State.

The laws of Maryland do not contain any definite requirements for storage of explosives, except that the Insurance Statute authorized the State insurance commissioner to issue regulations covering same. An excellent set of regulations was made effective on March 1, 1942, but the provisions relating to the construction of magazines did not apply to magazines constructed and in operation prior to that date. The law and regulations require that frequent inspections be made by the deputies appointed by the insurance commissioner to determine whether holders of licenses are complying with the requirements of the regulations. Deputies were either members of organized fire departments or other suitable persons from State agencies. A license must be obtained to possess explosives.

Massachusetts

Nearly two million pounds of explosives were used in Massachusetts between January 1, 1942, and December 31, 1944. Most of the explosives were used in war construction work, as normally the quarries and nonmetallic-mineral industries require approximately 300,000 pounds annually. Most of the permanent magazines were better than average. Reports were submitted on 137 storages, 87 of which were classed as requiring permanent magazines and 50 as requiring box-type magazines. According to the reports, 112 of the facilities were classed as satisfactory for storage when improvements were made, and 44 facilities, or 32.1 percent of the total, were approved on first inspection.

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Final analysis shows very good compliance with Federal wartime explosives-storage requirements, as 87.6 percent of the storages met the requirements and 15 new magazines were constructed.

The Fire Prevention Code of the laws of Massachusetts requires a license for the storage of explosives but contains no specific requirements for magazine construction; however, the Department of Public Safety has the authority to make rules and regulations covering the storage of explosives. Such rules and regulations were issued by the State fire marshal in 1933 but are not in sufficient detail to insure safe and secure storage facilities. As an additional precaution to prevent theft of explosives after the declaration of war, a proclamation requiring continuous guarding of all explosives magazines was issued on December 15, 1942. This requirement was withdrawn sometime in 1944.

Michigan

More than 50 million pounds of explosives were used in Michigan during the period 1942 to 1944, inclusive. Approximately 75 percent of the explosives were used in metal mining, about 22 percent in quarrying, and the remainder in construction and other industries. Inspectors reported on 332 storages, 260 of which were in excess of 125 pounds and 72 of which were less than this amount. Storage facilities provided were well above the average, as 310 reports indicated well-constructed magazines and 123 of the facilities were approved on first inspection. In many cases, box-type magazines were provided for small amounts of explosives, and 51.4 percent of the small facilities were approved on first inspection. Many of the approved permanent magazines were those situated underground in metal mines.

General compliance throughout the State was excellent, as final tabulations show that 94.3 percent of the storages met Federal requirements and that 26 new magazines were constructed. The State authorities and private managements are commended upon the excellent explosives-storage facilities provided and for their cooperation in complying with the Federal wartime explosives regulations.

The State Laws of Michigan do not contain any specific requirements covering the storage of explosives, but the State Affairs Statute contains a provision that the Commissioner of State Police may promulgate reasonable rules and regulations covering such storage, and the Municipalities Statute provides that incorporated villages and cities may pass ordinances concerning explosives storage. An excellent set of regulations is being enforced by the Michigan State Police.

Minnesota

Over 51 million pounds of explosives were used in this State from 1942 to 1944, inclusive. Metal mining consumed approximately 97 percent of the total, and the remainder was used in other industries. Generally, storage facilities provided for large amounts were well-constructed, but facilities for small amounts were inadequate. Inspections were made of 573 storages;

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362 were reported as storing more than 125 pounds, and 211 were reported as storing less than this amount. Reports from inspectors indicated that 351 of the facilities were acceptable for storage and that 157, or 27.4 percent of the total storages, met the requirements on first inspection. Vendors of explosives were lax in providing adequate facilities, as 46 large facilities and 110 small facilities were considered inadequate on first inspection. Reinspections showed that many of these vendors had disposed of the explosives on hand and discontinued sale for the duration of the Federal Explosives Act.

Compliance was excellent in all industries, as the final results show that 91.6 percent of the licensees met the standards or discontinued storing explosives. During the inspection period, 44 new permanent magazines and 79 box-type magazines were constructed. Very good cooperation was obtained from the licensees.

The Minnesota Explosives Act required that a license be obtained to possess explosives but contained no provisions pertaining to the storage of explosives, excepting that the adjutant general could prescribe such regulations pertaining to explosives as he deemed necessary. The explosives act was repealed on February 15, 1943.

Other laws empower the authorities of villages and cities to regulate and prevent the storage of explosives. The State fire marshal's duties include the enforcement of all laws of the State pertaining to the storage of explosives.

Mississippi

During the period 1942 to 1944, inclusive, over seven million pounds of explosives were used in Mississippi, chiefly in construction work on Federal projects. Approximately half a million pounds are used annually in logging, seismograph exploration, and miscellaneous industries. Facilities for storage of large amounts of explosives were substantially constructed, but not much attention was given to the storage of small amounts. Inspections were made of 150 storages, 120 of which exceeded 125 pounds and the remainder were reported to be less than this amount. Reports indicate that 112 of the facilities were considered satisfactory for storage and could be improved to meet the requirements; 46 of the facilities, or 30.7 percent of the total inspected, were approved on first inspection.

Most of the permanent magazines were improved to meet the regulations or were replaced with new magazines, as final results show 88.3 percent compliance and the construction of 14 new magazines. Improvement in small facilities was not very great, as results show only 56.7 percent compliance and the construction of 9 new magazines. The average compliance for the State was 82.0 percent.

The statutes of Mississippi contain no provisions pertaining to the storage of explosives.

Missouri

Nearly 42-1/2 million pounds of industrial explosives were used in Missouri during 1942 to 1944, inclusive. Metal mining used approximately 40 percent of the total, coal mining 30 percent, quarrying and nonmetallic mining 25 percent, and other industries 5 percent. Reports covering 586 storages were submitted, 357 of which contained more than 125 pounds and 229 less than that amount. Permanent storage facilities were fairly well-constructed, but virtually no facilities were provided for storage of less than 125 pounds of explosives. Inspection reports indicate that 311 facilities could be classed as magazines, but only 67, or 11.4 percent of all storages reported, were approved on first inspection. Only 49 of the small facilities could be classed as magazines and 13, or 5.7 percent of the total small storages, were approved on first inspection. Many of the licensees that were without adequate facilities on first inspection were vendors, quarry operators, and small coal operators.

The final results show a substantial improvement in storage facilities, as 96 new permanent magazines and 99 new box-type magazines were provided, and a total of 466 storages, or 79.5 percent of the total inspected, complied with the requirements. Quarry operators complied in nearly all cases, and reports show that 39 new permanent magazines were erected. A decided improvement was noted in vendors storage, as reports show the construction of 11 permanent and 65 box-type magazines.

Missouri has no explosives act, though some provisions on storage are included in the Mines and Mining Statute; surplus explosives in coal mines are required to be kept in a locked strong box, and explosives in excess of one day's supply at mines other than coal mines are required to be stored in a ventilated magazine. The State Bureau of Mines is the enforcement agency. In addition, the laws empower first-, second-, and third-class cities to regulate the storage of explosives.

Montana

Statistics show that during 1942 to 1944, inclusive, almost 31 million pounds of explosives were used in Montana. Approximately 60 percent of the total amount was used in metal mining, 30 percent in coal mining, and the remaining 10 percent in other industries. Inspections were made of 539 storages, 398 of which were reported to be storing in excess of 125 pounds and 141 of which were storing less than 125 pounds. Reports indicated that 287 of the large explosives-storage facilities could be remodeled to comply with the wartime requirements, and that 121, or 30.4 percent, of the large storages met the requirements on first inspection; most of the approved magazines were underground at metal mines. Generally, proper facilities for storage of small amounts of explosives were lacking on first inspection, particularly at small coal-mine and metal-mine operations. Reports show that only 25 of 141 storages were considered as magazines and only 17 were approved on first inspection.

Final results show good cooperation, in that 80.4 percent of the permanent storages complied with the requirements and 87 new magazines were constructed. Compliance in small storages was not good, as only 44 percent of the total met the requirements and only 40 new box-type magazines were provided. Noncompliance was indicated at coal and metal mines where both large and small amounts of explosives were kept.

The laws of Montana contain some excellent provisions covering the construction and location of explosives magazines, and all persons engaged in storing explosives must obtain licenses for each magazine. Before explosives are stored, a certificate of compliance must be obtained from the State fire marshal. Upon application, inspection is made to determine whether the magazine meets the requirements, and upon compliance the certificate is issued. The fire marshal is authorized to inspect each licensed magazine at least once a year.

Cities and towns have the authority to regulate and prevent the storage of explosives within 3 miles of the city limits. The State explosives laws do not affect any municipal regulations that are more restrictive.

Nebraska

Less than one million pounds of explosives were used in Nebraska during the period 1942 to 1944, inclusive, mainly in quarrying and construction. Reports show that little or no attention was paid to providing secure storage for explosives. Inspections were made at 72 locations where explosives were stored; in 26 places the amount stored exceeded 125 pounds, and in 46 the amount stored was less than 125 pounds. Storage facilities were considered suitable in only 22 instances, and only 3, or 4.2 percent of the total storages, met the Federal wartime explosives storage standards on first inspection. It was noted that vendors storing less than 125 pounds were the chief offenders, as 42 separate reports showed that only two of the facilities provided were considered suitable for classification as box-type magazines.

Even though 22 new magazines were constructed, compliance was very poor, as final results show that 63.9 percent of the total storages were improved or discontinued. Licensees engaged in selling small amounts of explosives were the main violators, as 19 failed to reply to letters.

The laws of Nebraska contain no reference to explosives storage, except that the fire marshal, under authority of the Governor, shall enforce State laws relating to the storage of explosives in those cases where a fire hazard exists. Some cities have the power to regulate or prevent storage of explosives by ordinance.

Nevada

More than 13 million pounds of explosives were used in Nevada during 1942 to 1944, inclusive. Approximately 83 percent of the total amount was used in metal mining and the remainder in construction, quarrying, and other industries. In the majority of the cases studied, the amount stored

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exceeded 125 pounds, and the permanent magazines in general were well-constructed. Most of the substandard facilities were noted at small metal-mining operations in isolated places. Inspections were made of 295 storages, 223 being classified as requiring permanent magazines and 72 as requiring box-type magazines. Inspection reports show that 216 facilities were acceptable as complying with wartime standards, and 57, or 19.3 percent of the total, were approved on first inspection.

Final tabulations show that 203 of the permanent magazines were either improved to meet the requirements or were replaced with new magazines. Compliance in small storages was only fair, and the average compliance for the State was 85.1 percent. Fifty-five new magazines were constructed, 40 of which were permanent buildings.

The laws of Nevada contain no provisions on the storage of explosives except that county commissioners must prohibit the storage of explosives within one quarter of a mile from the limits of any city or town when petitioned to do so by 10 percent of the residents of that city or town.

New Hampshire

Nearly one million pounds of explosives were used in New Hampshire during the 3-year period 1942 to 1944, mainly in construction, quarrying, and nonmetallic mining. Inspections were made of 141 storages, 68 of which were in excess of 125 pounds capacity and 73 contained less than this amount. First inspection reports indicated that 16 facilities, or 11.3 percent of the total storages, were in compliance with wartime regulations, and that 59 more would be satisfactory after certain improvements were completed. Generally, the facilities provided for storage of large amounts were found to be adequate, but the small facilities were not always so. Local government agencies and miscellaneous users were noted to be the chief offenders.

Compliance was very good, especially among the small storages, as the final results show that 85.8 percent of the total complied with the regulations. Reports and replies to letters indicate that 33 new magazines were constructed.

The New Hampshire Explosives Act requires that a license be obtained to possess explosives but contains no provisions regarding the storage of explosives; other laws empower city councils to regulate the storage of explosives.

New Jersey

Statistics show that more than eight million pounds of explosives were used in New Jersey from January 1, 1942, to December 31, 1944. Approximately two-thirds of the total was used in mining iron and zinc ores and the remainder in quarrying, construction, and other operations requiring explosives. Generally, the facilities provided for storage of large and small amounts of explosives were satisfactory. Reports show inspections of 167 explosives-storage facilities, 82 of which were used for storing large amounts of explosives and 85 for storing small amounts. The inspectors reported that 136 of the facilities were suitable and 67, or 40.1 percent of the total, met the requirements on first inspection.

Compliance was good, especially with the licensees storing small amounts of explosives, as final results show that 87.4 percent of all storages met the requirements. Nineteen new magazines were constructed.

The New Jersey Explosives Act is specific as regards manufacturing, transporting, storing, and handling explosives, but there are no requirements pertaining to the construction of explosives magazines, though plans for proposed magazines must be submitted to and approved by the Commissioner of Labor, who is authorized to administer the provisions of the Explosives Act and to make such rules and regulations as may be required. Inspectors or technicians are appointed by the Commissioner of Labor and authorized to make periodic inspections to determine whether there has been complete compliance.

New Mexico

More than 30 million pounds of explosives were used in New Mexico during the years 1942 to 1944, inclusive. Approximately 45 percent of the explosives were used in metal mining, 30 percent in quarrying and nonmetallic mineral mining, 20 percent in construction, and the remainder in coal mining and other industries requiring explosives. Inspections were made of 510 explosives storages, 238 of which were in excess of 125 pounds and 272 were less than this amount. Reports submitted show that 216 of the facilities would be suitable for wartime explosives storage after improvements had been made, and that 40, or 7.8 percent of the total, met the requirements on first inspection. The majority of the facilities considered suitable were permanent magazines, as little attention had been paid to the storage of less than 125 pounds of explosives. Many licensees who stored small amounts were engaged in coal mining, metal mining, farming, and ranching and discontinued storing after the first inspection.

Even though 31 permanent magazines and 82 box-type magazines were constructed, compliance was only fair, as the final tabulations show that 80.2 percent of the facilities met the requirements. A large percentage of compliance resulted from the discontinuance of storage of small amounts of explosives; most of the licensees not complying were operators of small metal mines or prospects.

The Mining Laws of New Mexico require that explosives be stored in magazines constructed and located in accordance with the recommendations of the explosives manufacturers; however, at mines other than coal mines the explosives may be stored in locked underground magazines. The State Inspector of Mines is authorized to make inspections at least once each year. Municipal corporations are empowered to regulate or to prevent the storage of explosives.

New York

Slightly more than 29 million pounds of explosives were used in New York from January 1, 1942, to December 31, 1944. Statistics show that about 46 percent of the explosives were used in quarrying, 38 percent in metal mining, 10 percent in construction, and the remainder in miscellaneous industries. Reports were submitted on 916 facilities where explosives were stored; 527 were classified as permanent storages and 389 as box-type storages. Many of the storages inspected belonged to local government units (chiefly towns and villages), contractors, and other small users of explosives. In many cases the small amounts of explosives on hand were disposed of either by use or destruction. Generally, storage facilities were found to be well-constructed and were acceptable, as 820 were classified as magazines and 219 were approved on first inspection. Many of the deficiencies included lack of approved locks, improper fastening of hinges, hasps, and staples, and failure to anchor box-type magazines.

Compliance with the Federal Regulations was not particularly satisfactory, as the results show that only 78.3 percent of the storages met the requirements and 57 new magazines were constructed. Most of the unanswered letters were addressed to quarry operators, vendors, local government authorities, and contractors.

The Explosives Statute contained in the New York labor law is excellent and contains some specific requirements as to the construction and location of explosives magazines. The law does not apply to cities having more than one million inhabitants. The industrial commissioner may prescribe such regulations as are considered necessary to administer the provisions. The Bureau of Mines, Tunnels, Quarries, and Explosives of the Department of Labor is the enforcement agency. A license must be obtained to possess explosives, and a certificate of compliance must be obtained before explosives can be stored; however, the storage requirements do not apply to the explosives used for agricultural purposes by a farmer on his own farm when the amount does not exceed 200 pounds at any one time. A certificate is issued after the magazine has been inspected and approved; regular inspections are made to determine whether the facilities are still satisfactory.

Other laws allow towns and villages to regulate the storage of explosives within the limits of the municipality.

North Carolina

Statistics show that nearly 16 million pounds of explosives were used in North Carolina during the years 1942 to 1944, inclusive. More than 55 percent of them were used in construction work (mainly on Federal projects), about 37 percent in quarrying and nonmetallic mineral mining, and the remainder in metal mining, coal mining, and other industries. Reports were submitted on 385 storages, 237 of which were classed as requiring permanent magazines and 148 as requiring box-type magazines. The facilities

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provided for storage, especially for small amounts, were not particularly satisfactory, as 215 were considered suitable to meet the minimum standards after improvements had been made and only 36, or 9.4 percent of the total storages, were approved on first inspection. More than half of the approved magazines were owned by State agencies and by manufacturers of explosives. Facilities for small amounts of explosives provided by vendors, nonmetallic-mine operators, and miscellaneous users of explosives were inadequate, as only 17 out of 148 were considered to be accepted as box-type magazines on first inspection.

Final results show that only 74.5 percent of the storages complied with the requirements or were discontinued and that 59 new magazines were constructed. Very little improvement was noted in the facilities of vendors and mica-mine operators; however, reinspection reports show that many of the former discontinued handling explosives.

The laws of North Carolina contain no provisions pertaining to the storage of explosives, except that municipal corporations have the power to regulate, control, or prohibit such storage within the city.

North Dakota

Virtually all of the two and a half million pounds of explosives used in North Dakota from January 1, 1942, to December 31, 1944, were used in the production of coal and lignite. Inspections were made of 333 storages; at 133 the amount stored was more than 125 pounds and at 200 the amount stored was less than 125 pounds. In most cases the facilities provided were not satisfactory, as only 113 could be considered as magazines and only 16, or 4.8 percent of the total, were approved on first inspection. Licensees operating coal mines and those selling explosives were the main offenders in failing to provide storage facilities for large and small amounts of explosives.

Some improvement was noted in storage conditions around coal mines, as reports show the construction of 40 permanent magazines and 45 box-type magazines at these operations. Final tabulations show only fair compliance, in that 70.9 percent of the total storages were determined as meeting the requirements. During the inspection period 122 new magazines were constructed. There is a definite need for further improvement of explosives storages in North Dakota.

The statutes of North Dakota require that all explosives in coal mines must be kept in a securely locked box; other provisions empower city and village authorities to regulate or prevent the storage of explosives within the limits of the city or village.

Ohio

Nearly 50 million pounds of explosives were used in Ohio during 1942 to 1944, inclusive. Statistics show that approximately 50 percent of the explosives were used in quarries and nonmetallic-mineral operations, 41

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percent in coal mines, and the remainder in construction and other operations; 1,035 storages were inspected, 515 of which were storing more than 125 pounds of explosives and 520 were storing less than that amount. Generally, the facilities provided for keeping large amounts of explosives were well-constructed, but most of the small storage places were deficient in numerous features and certainly not secure against theft. Reports show that 439 large facilities and 188 small facilities could be improved to meet wartime standards, and that 134, or 12.9 percent of all the storages, were approved on first inspection. Most of the inadequate large and small facilities were found at coal mines.

Final reports show that 154 new magazines were constructed. Many of the vendors storing small amounts of explosives discontinued handling and storing after the first inspection. Tabulated results show that only 69.1 percent of the storages met the requirements of the Federal wartime explosives regulations, which does not show very good compliance. Most of the unanswered letters were addressed to coal-mine operators and vendors; the tabulations show 190 letters for coal operators and 72 letters for vendors. These letters show a need for improvement in existing magazines as well as construction of new magazines.

The explosives laws of Ohio contain some good specifications on the construction of explosives magazines; however, the laws and regulations do not apply to explosives used for agricultural purposes in quantities not exceeding 200 pounds at one time, nor to any explosives not exceeding 5 pounds at one time. A certificate of compliance to store explosives must be obtained from the industrial commission. The magazine is inspected upon receipt of an application and the certificate is issued if the requirements are met. The law requires the inspection of operating magazines and also authorizes the industrial commission to provide such rules and regulations as may be considered necessary. Inspections are made by the Division of Factory and Building Inspection of the Department of Industrial Relations.

Other State laws authorize municipal corporations to regulate the storage of explosives within their jurisdiction.

Oklahoma

More than 32 million pounds of industrial explosives were used in Oklahoma from 1942 to 1944, inclusive. Approximately 39 percent of the explosives were used in metal mining, 26 percent in construction, 19 percent in quarrying, 15 percent in coal mining, and 1 percent for miscellaneous operations. Inspections were made of 549 storages, 456 of which were classed as requiring permanent magazines and 138 as requiring box-type magazines. Many of the facilities provided for large storages of explosives were underground in metal mines, and many of these were approved on first inspection. Inspection reports show that 462 of the facilities were classed as suitable for storage after improvements were completed and 202, or 34 percent of the total storages, were approved on first inspection.

A decided improvement was noted throughout the State, as reports show the construction of 78 permanent magazines and 29 box-type magazines. Compliance was good, and 86.9 percent of the explosive-storage facilities met the minimum wartime standards. There is, however, much room for additional improvement in storage facilities at coal mines.

The Explosives Statute of the Public Health and Safety laws required a license for the possession of explosives and empowered the Attorney General to prescribe rules and regulations. However, these laws were repealed in May 1943. The Coal Mining section of the Mines and Mining Law and the Lead and Zinc Mines Law contain some requirements for explosives magazines, but they are not specific.

Oregon

More than 17 million pounds of explosives were used in Oregon during 1942 to 1944, inclusive. Approximately 90 percent of this amount was used in construction work and the remainder in quarrying, logging, metal mining, and other industries. Oregon was one of the States in a critical wartime area, and particular attention was given to explosives storage facilities. Inspections were made of 868 storages, 564 of which contained more than 125 pounds and 304 contained less than 125 pounds. The storage facilities reported on first inspection were not very satisfactory, as only 417 were considered suitable and only 103, or 11.9 percent of the total inspected, met the wartime standards. Most of the inadequate explosives-storage facilities were found at logging operations, where little or no attention was given to the storage of explosives, and many of the facilities used by vendors and quarry operators were found to be unsatisfactory.

Through the cooperation of the licensees and the local authorities, vast improvements were noted on subsequent inspections. According to reports, 170 permanent magazines and 77 box-type magazines were constructed. Legal action was required in a few cases, but generally compliance was good as the final tabulation shows 87.2 percent of the storages meeting the requirements. Many of the vendors, loggers, and miscellaneous users of explosives discontinued storage and handling after being informed of the requirements.

The laws of Oregon contain no requirements for the storage of explosives, except that the State fire marshal shall enforce all laws and all lawful ordinances and make rules and regulations relating to the storage and use of explosives. In a proclamation issued by the Governor, under the authority of the Oregon Civilian Defense Act, the State fire marshal promulgated rules and regulations on the storage of explosives. The requirements were identical with those of the Bureau of Mines under the administration of the Federal Explosives Act and were effective from May 21, 1943, until revoked.

The State Industrial Accident Commission issued a safety code for construction on October 28, 1942, which contained specific requirements for the storage of explosives.

Pennsylvania

Pennsylvania ranks first among the States in the use of explosives, as statistics show that 262,511,419 pounds were sold and used in this State from January 1, 1942, to December 31, 1944. More than 78 percent of the total was used in coal mining, 16 percent in quarrying and nonmetallic-mineral mining, 3 percent in construction, and the remainder in metal mining and other industries. Generally, the facilities provided for storage of large amounts of explosives were well-constructed; however, a few inadequate facilities were found at some coal mines, mostly stripping operations, and at the premises of some dealers in explosives. A complete reversal of conditions was noted in the facilities used for the storage of small amounts of explosives, that is, less than 125 pounds, where virtually no security was provided. Of the 3,045 storages inspected, 2,163 were indicated as requiring permanent magazines and 882 as requiring box-type magazines.

Inspection reports on the 2,163 large storages of explosives show that 1,859 of the facilities provided were well-constructed and would meet the minimum standards after improvements were completed; the reports also showed that 487 facilities, or 22.5 percent of the total large facilities, met these standards on first inspection. Final tabulations show that 166 new permanent magazines were constructed and that 77.5 percent of the large storages complied with the wartime requirements. Although results show some improvement, unanswered letters and reinspection reports indicate the need for many additional new magazines and further betterment of existing magazines, especially at coal mines and quarries and at places where explosives are sold.

The reports on the 882 small storages inspected show that only 93 of the facilities could be considered as suitably secure box-type magazines and that 38 of these met the wartime standards on first inspection. The 38 approved magazines represent only 4.3 percent of the small storages inspected. The licensees who failed to provide acceptable storage facilities consisted of 520 coal operators, 211 vendors, 37 miscellaneous users, and 21 quarry operators. The final tabulations indicate some improvement in the construction of 235 new box-type magazines, but only 542, or 61.4 percent of the total small storages, complied with the regulations. Included as complying are 136 licensees who discontinued storing and handling explosives and 97 licensees who stated that explosives would be purchased as needed. Chief violators were licensees operating small coal mines and those vending explosives, as no replies were received from 272 letters addressed to the former and 66 letters sent to the latter.

The Pennsylvania Explosives Act contains no specifications on magazine construction but gives the Department of Labor and Industry the power and duty to make, alter, amend, or repeal general rules and regulations for storage of explosives and requires that a license be obtained for each magazine; the Act does not apply to explosives used in coal-mining operations or agricultural work. Other State laws authorize cities to regulate the storage of explosives within their jurisdiction. The Mines and

Mining Law provides that explosives used in anthracite mines must be stored in accordance with special rules furnished by the manufacturers of explosives. The Mines and Mining Law does not contain any specific provisions regarding the surface storage of explosives at bituminous-coal mines.

The regulations issued by the Department of Labor and Industry effective October 23, 1937, are good and detail requirements for magazine construction. Licenses for magazines are obtained by submitting information showing compliance with the provisions of the regulations; however, magazines erected prior to the effective date and which comply with the intent and purpose of the regulations but are not in accordance with all detailed specifications may remain at the discretion of the Department but may be required to comply with the requirements. Magazines are inspected to determine whether they meet the requirements. Those at coal-mining operations are inspected by State mine inspectors.

Rhode Island

Although nearly 500,000 pounds of explosives were used in Rhode Island during 1942 to 1944, inclusive, records show that approximately 95 percent of the total was used in Federal construction projects during 1942 and 1943. Normally, the amount of explosives used each year is small, chiefly in quarrying and construction. Inspections were made of 25 storages, 12 of which were reported as storing more than 125 pounds and 13 as storing less than this amount. Eighteen of the facilities provided were considered suitable for the storage of explosives and 6 were approved on first inspection, which represented 24 percent of the total. Compliance was excellent; as final tabulations show that 23, or 92.0 percent of the facilities, met the requirements and 3 new magazines were constructed.

The State Explosives Act requires a license for the possession of explosives but contains no reference to the storage facilities for such explosives, except that the attorney general may prescribe proper rules and regulations to enforce the provisions of the act.

South Carolina

Approximately three million pounds of explosives were used in South Carolina during 1942 to 1944, inclusive. About 45 percent of the explosives were used in quarrying and nonmetallic mineral mining, 45 percent in construction, and the remainder in other industries. Inspections were made of 138 storages; 64 reports showed storage in excess of 125 pounds of explosives and 74 reports showed that less than this amount was being stored. Large storage facilities were reported to be substantially constructed, but many of the small facilities were considered inadequate. According to reports, the facilities at 73 places were satisfactory for storage and could be improved to meet wartime requirements, but only 16, or 11.6 percent of the total, met the standards on first inspection. Most of the inadequate facilities were reported as belonging to vendors and miscellaneous users of explosives.

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Compliance was fairly satisfactory, as the results show 80.4 percent of the storages meeting the wartime requirements, and the construction of 20 new magazines. Quarry operators, vendors, and miscellaneous users of explosives were indicated as the principal violators by failing to reply to letters.

The laws of South Carolina contain no provision pertaining to the storage of explosives.

South Dakota

Statistics show that nearly two million pounds of explosives were used in South Dakota during the years 1942 to 1944,inclusive. Nearly one-half of this amount was used in metal mining in 1942, probably in mining gold ore, as subsequent years show a decided decrease in the amount of explosives used after issuance of the order that closed gold-mining operations. Most of the other explosives were used in quarrying, nonmetallic mineral mining, construction, and coal mining. Inspections were made of 269 explosives storages; at 110 places the amount stored was more than 125 pounds and at 169 locations the amount on hand was less than this amount. The facilities provided for the storage of explosives were not very satisfactory, as only 110 were considered to be magazines that could meet the wartime requirements after improvements. Only 15 magazines, or 5.6 percent of the storages inspected, were approved on first inspection.

Some improvement was noted, as reports show the construction of 76 new magazines; but compliance throughout was just fair, as 74.3 percent of the storages met the wartime requirements or were discontinued. The final tabulations show a need for additional improvements in the storage of explosives throughout essentially all industries in this State that use explosives.

The South Dakota statutes contain no provisions pertaining to the storage of explosives.

Tennessee

According to statistics, 32,936,135 pounds of explosives were used in Tennessee from January 1, 1942, to December 31, 1944; approximately 14 million pounds of the explosives were used in construction of Federal projects. About 40 percent of the yearly amount is used in mining coal, 25 percent in mining copper ore, 25 percent in quarrying, and the remainder in construction and other industries. Most of the explosives-storage facilities were not satisfactory, especially those provided for less than 125 pounds. Inspections were made of 449 storages, 316 of which were in excess of 125 pounds and 133 that were less than this amount. Reports show that 237 of the large facilities and 12 small facilities were considered suitable and could be improved to meet wartime requirements; 67 of the magazines were approved as meeting the standards on first inspection. The large magazines on the surface and underground at the metal mines were well-constructed; many of the small facilities at small coal mines and those belonging to vendors of explosives were inadequate.

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Although reports show the construction of 49 permanent and 38 box-type magazines, compliance was not very good. Final tabulations show only 61.2 percent compliance with wartime regulations for storage of explosives throughout the State; most of the violators were operators of coal mines, as 117 of the unanswered letters were addressed to these licensees.

The Tennessee statutes contain no specific requirements pertaining to the storage of explosives, except that it is unlawful to keep more than 50 pounds of explosives within the limits of any incorporated city or town. Additional provisions give municipal corporations the authority to regulate the construction of magazines beyond the limits of the corporation, and authorize the State commissioner of labor to make regulations covering the storage of explosives. Regulations pertaining to the storage of certain types of explosives were issued by the State fire marshal on February 1, 1938.

Texas

Nearly 32 million pounds of explosives were reported to have been used in Texas during 1942 to 1944, inclusive. About 70 percent of the total was used in Federal construction, about 20 percent in quarrying and nonmetallic mineral mining, and the remainder in seismograph exploration, metal mining, coal mining, and other industries. Many of the permanent storage facilities were constructed substantially and could be altered to meet wartime explosives-storage requirements, but most of the small facilities were inadequate. Reports were submitted on 793 storages; 544 were listed as storing more than 125 pounds and 249 as storing less than 125 pounds. The inspectors reported that 532 of the facilities were suitable for wartime storage after improvements and that 222 magazines were approved as satisfactory on first inspection. Failure to provide adequate facilities was prevalent among contractors, small dealers in explosives, and miscellaneous users. Excellent magazines were being used by seismograph companies, large vendors of explosives, and quarry operators.

Generally, the compliance of all industries was good, especially as to storage of large amounts. Reports show that 162 new permanent and box-type magazines were constructed and that 89.2 percent of the total storages on which reports were received complied with the requirements or were discontinued for the duration of the war.

The laws of Texas contain no provisions pertaining to the storage of explosives, except that the authorities of cities, towns, and villages have the power to direct, control, prohibit, or regulate their storage within the limits of the city.

Utah

More than 35 million pounds of explosives were used in Utah during 1942 to 1944, inclusive. Approximately 78 percent of this amount was used in metal mining, 17 percent in coal mining, and the remainder in quarrying, construction, and other industries. Reports show that many of the storage facilities were considered satisfactory and would be approved upon completion of improvements. Inspections were made of 452 storages; the amount stored at 317 places was in excess of 125 pounds and at 135 places it was less than 125 pounds. According to the reports, 363 of the facilities were considered satisfactory and 160, or 35.4 percent of the total, were approved on first inspection. Many of the approved magazines were in underground metal mines. Most of the inadequate facilities were reported to be at small metal mines where the amount stored was less than 125 pounds.

The final tabulations show that 79 percent of the storages were improved to meet the wartime standards, which certainly does not indicate good cooperation. Most of the licensees who failed to comply were operators of metal mines. A total of 62 new magazines was constructed during the inspection period.

The State Explosives Act requires a license for possession of explosives but contains no requirements for construction of magazines except that the attorney general may prescribe rules and regulations considered necessary. Other laws empower the counties, cities, and towns to regulate or prevent the storage of explosives.

Vermont

Slightly more than one million pounds of explosives were used in Vermont during 1942 to 1944, inclusive. More than half of the explosives were used in construction work, and nearly all of the remainder in quarrying and nonmetallic mineral mining. Inspections were made of 139 places used for the storage of explosives; at 67 locations the amount of explosives stored was more than 125 pounds, and at 72 places it was less than 125 pounds. Reports show that 95 of the facilities were considered good enough for wartime explosives storage and would meet the requirements after improvements had been made; and 31 magazines, or 22.3 percent of the total storages, were approved on first inspection. Inadequate facilities were maintained by some local government agencies, miscellaneous users, and vendors storing small amounts of explosives.

Final tabulations show very good compliance, as 91.4 percent of the storages were improved to meet the wartime requirements or discontinued, and 36 new magazines were constructed.

Neither the State Explosives Act nor the rules and regulations promulgated by the Attorney General contain requirements for explosives storage magazines. State licenses are issued by town selectmen or the State fire marshal to those who qualify. On February 1, 1945, the fire marshal issued some instructions on storage magazines that were similar to the Federal wartime requirements. Incorporated villages may enact regulations covering the storage of explosives.

Virginia

Nearly 26 million pounds of explosives were used in Virginia during 1942 to 1944, inclusive. Approximately 50 percent of the total was used in coal mining, 28 percent in quarrying and nonmetallic mining, 12 percent in construction, and the remainder in metal mining and other industries. Inspection reports were submitted on 259 storages, 204 of which were classed as storing more than 125 pounds of explosives and 55 as storing less than this amount. First inspection reports indicated that the facilities in use were not very good, and many used at coal mines and quarries and by vendors of explosives were substandard. Inspectors classed 168 of the facilities as suitable and would be approved after improvements, but only 22, or 8.5 percent of the storages, met the wartime explosives storage requirements on first inspection.

Even though 55 permanent magazines and 14 box-type magazines were built during this period, compliance with wartime explosives-storage requirements was not satisfactory; final results show that 69.1 percent of the storages inspected met the requirements or were discontinued. Most of the unanswered letters were addressed to coal-mine operators, quarry operators, and vendors of explosives.

The only specific provisions on the storage of explosives in Virginia laws is contained in the Labor Statute requiring that the exterior construction of magazines shall be of noncombustible material, but this does not apply to magazines built prior to March 7, 1940, unless the storage facilities have been condemned by the State mine inspector. The councils of cities and towns have the power to regulate the storage of explosives within their jurisdiction.

Washington

More than 30 million pounds of explosives were used in Washington from January 1, 1942 to December 31, 1944. More than 60 percent of the total was used on construction projects (mainly Federal work), about 20 percent in metal mining, 10 percent in coal mining, and the remainder in logging and other industries. The State is in an area that was termed critical by the War Department, and special attention was given to explosives-storage facilities. Inspections were made of 634 storages; 484 were used for storing more than 125 pounds of explosives, and 150 were used for storing less than this amount. Reports show that some attention had been given to providing storage facilities for large amounts of explosives, but little or no attention was paid to the storage of small amounts. Inspectors indicated that 429 of the facilities were well-constructed and would be approved after improvements were completed; however, only 108, or 17 percent of the total storages inspected, were approved on first inspection. A review of the reports shows that the logging industry was especially lax in providing suitable permanent magazines, and that many of the vendors and miscellaneous users of explosives had no box-type magazines. Many of the licensees storing small amounts of explosives decided to discontinue storage and to purchase as needed.

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Compliance throughout the State was good, as final tabulations show that 82.3 percent of the storages either met the wartime standards or were discontinued. Eighty new magazines were constructed. Most of the unanswered letters were transmitted to logging companies, vendors, and miscellaneous users of explosives.

The Explosives Act of the State of Washington contains good specifications on the construction of explosives magazines, which are similar in many respects to the requirements of the Federal wartime regulations. The Department of Labor and Industries is charged with enforcement of the provisions of the Act, authorized to issue licenses required for storage and possession of explosives, and inspect magazines annually. The State laws also allow municipalities to regulate or prohibit the keeping or storage of explosives within their corporate limit. Such rules, regulations, and ordinances are not affected by the Explosives Act, provided they are not less restrictive then the provisions of the Act.

After the declaration of war, a Governor's announcement authorized the State Patrol to assume supervision and control of explosives throughout the State effective May 1, 1942, for the duration of the war.

West Virginia

West Virginia ranks second among the States in the amount of explosives used, as statistics show that 96,247,678 pounds were reported used in the period from January 1, 1942, to December 31, 1944. Approximately 88 percent of the total was used in coal mining, 6 percent in quarrying, 4 percent in construction, and the remainder in miscellaneous industries. Inspection reports were submitted on 1,793 storages, 1,281 of which were used for storing amounts greater than 125 pounds and 512 of which were used for storing smaller amounts. Generally, the large storages were acceptable, but little or no attention was given to the storage of small amounts of explosives. Explosives-storage facilities numbering 1,101 were classed as satisfactory or could be improved to meet the requirements, but only 187, or 10.4 percent of the total, were approved on first inspection. Reports show that of the 512 small storages, only 80 could be considered suitable. Most of the inadequate facilities were found at coal-mining operations, especially at strip mines and small operations where explosives were often found with no protection against theft. Inadequate facilities were also found at places where explosives were sold in small amounts.

Some improvement was obtained through the construction of 263 permanent magazines and 139 box-type magazines, but there remains a definite need for better facilities at many places, as only 69.9 percent of the total storages were improved to meet wartime requirements or were discontinued. The unanswered letters in the files indicate that facilities at 442 large and small coal operations did not meet standards.

The officials of the West Virginia State Road Commission are commended for their cooperation in complying with the regulations through the construction of new magazines and remodeling of existing magazines.

The laws of West Virginia contain only one direct condition pertaining to the storage of explosives. The Mines and Minerals Statute, applicable to coal mines, sand mines, sand pits, clay mines, clay pits, quarries, and cement works, requires that the outside construction of explosives magazines shall be of noncombustible material. The authorities of municipal corporations have the authority to regulate the storage of explosives within their jurisdiction.

Wisconsin

More than 13-1/2 million pounds of explosives were used in Wisconsin during 1942 to 1944, inclusive; approximately one-third of this went to metal mining, one-third to quarrying, and the remainder to construction and other industries. Inspections were made of 630 storages; 337 were classed as requiring permanent magazines and 293 as requiring box-type magazines. Generally, the facilities provided were substantially built but many were classed as inadequate, especially those provided by vendors and used for storing less than 125 pounds of explosives. According to the reports, 424 facilities were indicated as satisfactory and could be improved to meet the wartime requirements, and 93, or 14.8 percent of the storages reported, were approved on first inspection.

Final compliance was not satisfactory, as the results show that 75.1 percent of the total met the wartime requirements or discontinued storage. Seventy-three new magazines were built during the inspection period. Noncompliance was prevalent among vendors of explosives, as there were 113 unanswered letters addressed to such licensees.

The laws of Wisconsin had some regulations on the storage of gunpowder and black powder in cities and villages, but they were repealed in June 1943.

The statutes require the State Industrial Commission to promulgate necessary general orders on storing and handling explosives, and some orders have been in effect since March 27, 1933, but the specifications are not particularly definite. The laws require that the County Sheriff and District Attorney enforce the general orders of the industrial commission.

Wyoming

More than eight million pounds of explosives were used in Wyoming during 1942 to 1944, inclusive. Approximately 61 percent of the total was used in coal mining, 21 percent in metal mining, and the remainder in other industries. Inspections were made of 302 storages; 206 were used for storing more than 125 pounds of explosives and 96 were for smaller amounts. The inspectors indicated that 181 of the facilities were suitable and could be improved to meet the standards and that 53 magazines met the wartime requirements on first inspection. Most of the poorer facilities were noted at coal mines.

The results show a great improvement during the inspection period, as 91.1 percent of the storages met the requirements of the regulations. During these years, 77 new magazines were constructed.

Wyoming has no explosives act, but other laws contain a few specific provisions pertaining to the storage of explosives. New magazines must be constructed in such a manner that the explosives will be stored entirely below the surface of the ground adjacent. In addition, cities of the first class have the power to regulate the storage of explosives within the city or within a given distance of the corporate limits of the city.

CONCLUSIONS

The results of the first or original inspection reports clearly show the lack of adequate explosives-storage facilities in the United States prior to World War II. It is regrettable that a war was necessary to bring these conditions to the attention of persons storing, handling, and using explosives as well as to State authorities charged with administering the provisions and regulations of the State statutes where such statutes exist. The final tabulations show that great improvement was effected in all classes of explosives storage through the administration of the Federal Explosives Act and with the aid of the State authorities or the armed forces. Commendation is due those licensees who cooperated by complying with the storage requirements set out in the regulations. Many licensees welcomed the assistance of the inspectors in planning the construction of new magazines and in remodeling existing magazines. The minimum standards on magazine construction in general were well-received and proved to be beneficial to the licensees in indicating how to provide satisfactory explosives-storage facilities. In addition to determining whether the magazines were well-constructed and theft-resistant in accordance with the requirements of the wartime Federal Explosives Act, the inspectors also suggested the adoption of numerous safety measures to be followed in storing and handling explosives and endeavored to point out the principles applicable to efficient methods of storage so as to prevent the deterioration of explosives and thus eliminate possible accidents.

The fact that 4,883 new magazines were built and 11,617 existing magazines were improved during this period, when both material and labor were scarce, indicates that the people storing and using explosives recognized the dangers inherent in poor storage and is evidence that suitable precautions may be observed in the future to a far greater extent than before the Federal Explosives Act became effective. There is also a probability that improvements were made to many storages, and no replies were made to the letters sent as a result of the inspector's report. A total of 3,642 licensees decided to discontinue storing and handling explosives or made provisions to purchase explosives as needed, either because of operation shut-downs or inability to provide suitable storage, or because explosives on hand were no longer needed, or for some other reason. Each licensee who was contacted by the Federal Explosives Investigator was instructed in the wartime requirements, and there is a possibility that suitable facilities will be provided in many cases when

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explosives are again stored by persons or agencies that discontinued doing so because of restrictions imposed by the requirements of Federal wartime regulations.

In ordinary times, regulations on storing and handling explosives are directed chiefly toward safety and to only occasionally toward security from theft and illegal or unauthorized use. It should not be necessary to wait for a state of emergency before adequate steps are taken to prevent explosives from getting into the hands of persons not acquainted with their use, especially children. Inadequate and insecure storage facilities should be classed as law violations and should subject violators to punishment the same as other crimes. Every year, carelessness and laxity in storage of explosives result in hundreds of men, women, and children obtaining possession of all types of explosives, and scores of them lose eyes, fingers, arms, feet, or are fatally injured, chiefly because they are inexperienced in handling and using explosives. The authorities of States and cities should be made aware of the existing laxity in storing explosives and should take definite steps to remedy the defects. States and cities should, by all means, adopt adequate laws and make workable regulations, rules, and ordinances to provide for safe and secure storage of explosives within their jurisdiction. Experiences legal and technical personnel are available to aid in formulating such statutes. Preferably, a standardized explosives act should be formulated and adopted by all States.

The record shows that extensive improvements in explosives-storage facilities were made throughout the United States as a direct result of the administration of the Federal wartime Explosives Act during World War II, and it is hoped that the good work that has been accomplished and the benefits that have been realized will not be lost now that the war is ended. The thousands of explosives-storage magazines that have been constructed and improved during World War II have more than justified the expenditure of effort and funds involved in the administration of the Federal Explosives Act.

During the period of operation of the Federal Explosives Act, several publications were issued by the Bureau of Mines pertaining to the storage or use of explosives, among them:

I. C. 7259 - Accidents Due to Misuse of Explosives. 1943.
I. C. 7275 - Accidents to Children From Blasting Caps. 1944.
I. C. 7278 - Some Suggestions in the Use and Handling of Explosives in Coal Mines. 1944.
I. C. 7281 - The Burning Rate of Fuse. 1944.
I. C. 7307 - Surface Storage of Explosives. 1945.
I. C. 7335 - Destruction of Damaged, Deteriorated, or Unwanted Commercial Explosives. 1945.
I. C. 7343 - Storage of Explosives in Underground Mines of the Lake Superior District. 1946.
I. C. 7356 - Explosives Handling Practices at the Mines of the Anaconda Copper Mining Company at Butte, Mont. 1946.

Also, a pamphlet of 55 printed pages was issued in June 1944 embodying:

The Federal Explosives Act of December 26, 1941 (55 Stat.-865) as amended.
Regulations issued under the Federal Explosives Act.
Recommendations for Storing, Handling, and Transporting Explosives.